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California and the 21st Century: Foundations for a Competitive Society, Volume I

Senate Select Committee on Long Range Planning

CALIFORNIA AND THE 21st CENTURY: FOUNDATIONS FOR A COMPETITIVE SOCIETY

VOLUME I

A Report of the Senate Select Committee
on Long Range Policy Planning

Senator John Garamendi, Chair

January 1986

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SENATOR JOHN GARAMENDI
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Dear Californian:

I am pleased to provide you with a copy of California and the 21st Century: Foundations for a Competitive Society. This three volume work represents the work of the Senate Select Committee on Long Range Policy Planning, its Task Forces, the participants of seven roundtable discussions and the staff of SRI International.

I believe the reports describe the challenges which must be faced by the people of California if we are to continue to prosper and plan for the growth of California's economy. Sometimes, in the midst of an economic upswing, it is difficult to recognize the downward trends in key industries in California. Our reports describe those warning signals and suggest strategies to meet those challenges.

The State of California must continue to make investments in its people, its infrastructure, and its environment. It also must nurture the entrepreneurial climate that has made California a leader in innovation.

I would like to give special thanks to Celia Ballesteros, William DeMers, John Emerson, Joel Kotkin, Hal Kwalwasser, Melanie Lomax, and Andy Safir of the Editorial Board; Regis McKenna, Chair of the Industrial Competitiveness Task Force; Elinor Glenn, Chair of the Human Resources Task Force; Mary Nichols, Chair of the Public Sector Task Force; and Tim Wallace, Chair of the Agriculture Task Force for their work for the Select Committee.

I also want to thank the other task force members and participants in the roundtables for their work.

Sincerely,

John Garamendi

JG:vod

SENATE SELECT COMMITTEE
ON
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ACKNOWLEDGEMENTS

This report was prepared by the staff of the Senate Select Committee on Long Range Policy Planning and the Joint Committee on Science and Technology. It reflects the input gathered from the Task Forces on Industrial Competitiveness, Agriculture, and Human Resources, the participants of the Roundtable discussions on Industrial Competitiveness, Trade, and Human Resources, the advice of Steve Waldhorn and Doug Henton of the Public Policy Center Project of SRI International, and Allison Thomas of Allison Thomas Associates.

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CHAPTER 1

Introduction

California, the envy of the rest of the world, has truly been a Golden State, a state which has been able to offer a climate hospitable to innovation and diversity. Thanks to our world leadership in innovative products, our strong basic and university educational system, and our abundant natural resources, most have shared in the realization of the California Dream.

Ironically, even with the constant spirit of change which animates our innovation-centered economy, we have failed to take note of many important changes in the world which now pose grave threats to our way of life.

We are mesmerized by today's apparent record levels of prosperity. We have more people employed with more new businesses, products, and services than ever before.

Yet, there are signs of massive problems ahead. An apt California metaphor might be that of a fine luxury car cruising down the freeway, with red warning lights on the dashboard. While the car seemingly functions at peak efficiency, the lights give warning of serious problems to come.

Those warning lights tell us of California's ever-expanding trade deficits, more than $20 billion last year, which is an increase of more than one thousand percent in only four years.

They tell us of long-term declines in productivity growth and of the ability of foreign competitors to take over the innovative products we first developed. Their ability to manufacture and market those products more effectively than we portends grave troubles ahead.

They tell us of the growing militarization of our process of discovery and innovation, the very process which has led to our strength in an increasingly technology--and knowledge-based economy, and of the diversion of some of our most creative minds into the unproductive designing of weapons which we pray will never be used.

And they tell us also of a coming crisis in our society, a society which is becoming older and more ethnically diverse, a society in which one-quarter of the adult population is now functionally illiterate.

We must look at the factors which give rise to this situation and devise policies which will help California move beyond these hurdles. The most critical factor to keep in mind is the constancy of change.

The world has grown much more interdependent since the Second World War. New and powerful global competitors have emerged. Many of them have taken advantage of our ideas to make themselves more prosperous and formidable contenders for economic supremacy.

The pace of change itself has quickened as technological innovation has increased. The global economy is driven by the development and application of technology in sectors ranging from agriculture and energy development to breakthroughs in the outer ranges of information science and biological engineering.

California has historically been strongest in innovation and entrepreneurship. These are the research and product development phases of what might be described as the life cycle of innovation--a process which begins with basic research and must continue, for purposes of long-term success, through phases of high-quality, efficient manufacturing and international marketing.

We are losing our competitive edge in manufacturing and marketing. This development threatens our future ability to innovate and create the basis for new products through increased social investment in research.

What heightens the challenge to California is the fact that all this comes at a time in which our population is growing rapidly and becoming increasingly diverse.

If current trends continue, California will have a majority of "minorities" by the year 2010. The task of ensuring that the great majority of Californians will be both properly integrated into society and prepared for productive employment in a changing economy will place great strains on our educational system and social institutions. To maintain our industrial competitiveness we must use those institutions to turn out a highly-skilled, adaptable workforce.

INDUSTRIAL COMPETITIVENESS

California now faces an emerging crisis of competitiveness in the industries which have brought unparalleled economic strength and prosperity to the State. There are a number of reasons for this alarming development.

Ballooning federal budget deficits have given rise to an overvalued dollar, having the effect of eliminating the competitive price advantages of our products. And foreign competitors have engaged in unfair trading practices, erecting subtle (and not so subtle) barriers to the export of our products and providing major government assistance to strategic industries.

These factors, along with our declining productivity advantage, have had major adverse impacts on our competitive posture with respect to the rest of the United States and the world.

The first two factors leading to our crisis of competitiveness are best dealt with at the federal level. Federal action--particularly in the areas of tax and budget policy, the cost and availability of capital, research and development priorities and education and training programs--is essential to assist our industry in sustaining its own inherent competitiveness.

However in this area, action by state government can also be quite helpful. The State of California can and must play a catalytic role in assisting industry in improving its competitiveness.

The challenge is great and the facts alarming. Between 1981 and 1984, California's trade deficit increased from $1.8 billion to $17.1 billion, an increase of some 950% in only three years. Every indication is that the figure for 1985 will be even higher.

This striking trade imbalance only highlights a problem with long-term, deep-rooted causes. This is reflected in California's declining productivity advantage (viz. comparison of productivity in California relative to the U.S. average). Superior productivity measured in terms of value added per production hour has been a critical source of California's competitive edge. That productivity advantage has eroded in key California industries.

Our study, conducted by SRI International in conjunction with committee staff, shows that California's exports of agricultural products declined by 27% between 1981 and 1984, causing an erosion in farm incomes and leading to shocks in the State's banking sector.

California's predominance in the field of high technology manufacturing is slipping. We have lost our productivity advantage in computers as a 12% advantage in 1972 fell to a 7% disadvantage by 1982. In contrast, the Japanese have gained

increasing market shares in world exports of high tech products, including the highly strategic semiconductor markets. While we have retained our research base, we stand in danger of losing the high tech manufacturing base, the single largest source of new manufacturing jobs over the past decade.

In diversified manufacturing, we have lost much of our traditional manufacturing base while specialty areas such as apparel and printing have emerged as new centers of growth.

Massive new defense spending promoted the growth of aerospace and allied technologies, but California's ability to compete in the commercial aircraft market declined dramatically. Our share of commercial jet deliveries dropped from 41.5% in 1972 to 21.2% in 1982 while our overall productivity advantage in aerospace from 28% to 22% during the same period. The tremendous infusion of federal defense dollars into allied technologies carries with it the danger of further weakening the competitive edge of firms engaged in commercial enterprise.

California state government must be a catalyst in fostering the development of innovative products and industries and modernizing existing industries. Government can be a creative broker, using our existing strengths in new ways.

AGRICULTURE

The dramatic decline in California's farm exports is surprising indeed, in light of California's stature as the country's leading agricultural state. With some of the richest farmlands and best climate on the continent, we produce half the nation's fruit, nuts and vegetables.

No single crop dominates agricultural production in California. In fact, we produce over 250 separate commodities in this State.

Over one-fifth of our production is exported. Until recently, this diversity of production has shielded our agricultural industry from the traditional financial stresses of Farm Belt agriculture.

Since the very beginnings of agriculture, its hallmarks of success have been the achievement of higher yields and expanded production. In California, our university system has been a powerful ally in this cause, constantly finding new ways in which to boost the industry's production. Ironically, this very success is combining with external factors to push California's agricultural industry against a wall.

The overvalued dollar, high interest rates, declining land values and falling prices for increased volume of production all have led to many farm failures and threaten the survival of thousands more. Adding to this crisis are the difficulties we face in agricultural export markets due to the confusion in federal trade policy and heightened competition in the international marketplace.

As if these economic and political problems were not already enough, agriculture's resource base is now under siege. Our historic reliance on widespread irrigation has led to problems of soil salinity and agricultural drainage, soil erosion and toxic contamination of aquifers and waterways. We cannot merely attempt to solve these problems on a piecemeal basis if agriculture in this State is to be sustained.

In addition, our State government must take a much more active role in fostering an environment of long-term prosperity for agriculture through programs to help farmers to meet these new economic challenges.

We have succeeded in heightening our ability to produce. This has had an unintended result of market saturation, in some cases.

Now we must focus on sophisticated international marketing as a principal goal of our State's agricultural policy. We must develop and better coordinate information and assistance from the University of California and State agencies as well as ensure that these actors are attuned to new developments and opportunities in the global marketplace.

We must also assist farmers through better communication of information which can be used in their own strategic planning and management systems.

In addition, the ongoing significance of the export market for agriculture demands the attention of State government in the formulation of federal policy in agricultural trade.

INTERNATIONAL TRADE

California has emerged as a major center for international trade. Perhaps most striking is our presence as a major broker of exports to and imports from the Pacific Basin.

According to the California World Trade Commission, international trade has had major impacts on our State's economy. It has resulted in the generation of $35 billion in business revenues, $3.5 billion in government revenues, and more than $10.5 billion in wages and salaries from more than one million jobs directly related to trade in manufacturing, agriculture, and service industries. Between 1977 and 1983, growth in exports accounted for four of every five new private sector jobs in California.

Unfortunately, California is now running a very substantial trade deficit of more than $20 billion in 1985. Over 70% of our trade is conducted with nations of the Pacific Basin.

In order to ensure the continued industrial competitiveness so crucial to our long-term prosperity, we must develop a powerful export orientation to our economy.

While Canada, Europe, and Latin America constitute key existing and potential markets for California products, we must move decisively to take advantage of our historic position as the Gateway to the Pacific. With the federal government seemingly unable to formulate a coherent trade policy, California must play a major role in enhancing export opportunities in the Pacific Basin. We must penetrate the Japanese and Korean markets, both to sell our products and to provide strategic competition with our chief current and future industrial rivals.

China stands as an immense potential market and economic powerhouse. We certainly cannot afford to cede that emerging market to Japan, nor can we afford to ignore the Association of Southeast Asian (ASEAN) nations.

A partnership between California government, universities, and private industry must be forged for effective export promotion. If we move quickly and effectively, we can become the new "Yankee traders" of the dawning Pacific Century.

HUMAN RESOURCES: The Challenge of Growth and Diversity

In comparison with the rest of the United States, California has a well-educated and highly-skilled workforce. Nevertheless, current demographic projections indicate that we must make major investments in adult and K-12 education if we are to keep pace with our growth. We must do this in light of several salient facts.

California will become a state in which "minorities" make up the majority by the year 2010. Thirty-six percent of our workforce

will be Hispanic or Black in the year 2000. Over 50% of our school population will be "minority" in the year 2000.

Today, 82% of the nation's adult workforce possess high school diplomas. Unfortunately, 45% of the Hispanic and 29% of the Black adult workforces have dropped out of school prior to high school graduation.

As our workforce becomes increasingly characterized by minority participation, we must address the serious question of educational achievement posed by these numbers.

For 90% of our 1990 workforce and 75% of our year 2000 workforce are already on the job. And today, 25% of California adults are functionally illiterate.

To meet these challenges, California must have a constant supply of high achievers obtaining the finest instruction if we are to continue to innovate with the new products and processes we need to compete in the world.

Unless we are successful in meeting our challenges, we will run the severe risks of developing a two-tier economy and of being noncompetitive in the global economy.

CHAPTER 2

California's Industrial Competitiveness

INNOVATION CYCLE

California is the world's leading source of innovative products. Just last year, Science Digest Magazine identified California as producing one-fifth of the year's most important innovations in science and technology in the United States.[1]

This is part of the historic trend in California's economy. California's economy has made an important transition from one based upon the extraction of natural resources to one based upon technology. Even in the State's resource-based industries, the application of technology has become paramount in ensuring continued productivity and competitiveness.

As suggested above, our economic development has been marked by five major booms--gold, agriculture, oil, aerospace and microelectronics. With each of these, we have increasingly come to rely on innovation as the driving force of our economy. Innovation is now a crucial element in ensuring the continued viability of existing industries. And it is the critical factor in providing for the creation of new products and new industries.

We are pioneers in leading edge technologies and have led an economic revolution which is sweeping the globe. Over the past thirty years, the cost of computing has declined a hundred-fold while our consumer price index has increased four-fold.[2] Every drop in the price of computing power makes that power accessible for more and more applications and to more and more people.

The advent of technologies has changed forever the face of this State and this nation. The America of 1986 would scarcely be recognizable to a veteran returning home from World War II.

Today more than 60% of our workforce is employed in the creation, storage, processing or distribution of information. In 1950, the comparable figure was just 17%.[3]

Just as the shape of the State's and nation's economies have changed dramatically in 36 years, so too has the shape of the global economy. We are now part of a highly competitive, increasingly interdependent global economy. As new economic powerhouses have emerged around the world, chief among them Japan, our economy has gone from a state of national autonomy to a state of global interdependence and competition. Exports of American manufactured goods have risen from 9% of domestic production in 1970 to 21% in 1984. During the same period, imports increased as a percentage of U.S. manufacturing output from 5% to 24%.[4] Seventy percent of all American goods must now compete with imports in the international market.[5]

During this time, our patterns of international trade shifted dramatically. In 1980, for the first time in our history, cumulative trade between the U.S. and nations of the Pacific Basin exceeded that between the U.S. and Europe. As this trend has continued, so has our mounting deficit in trade with the Pacific nations.[6]

As the global economy became multipolar, our ability to dominate it dramatically declined. Particularly disturbing is that the bulk of our trade deficit, some 64% for 1984, lies in the area of manufactured goods.[7]

In share of world exports, the U.S. has declined from 15.4% in 1970 to 12.8% in 1984. In contrast, Japan's relative share has increased from 6.9% in 1970 to 10.2% in 1984.[8] Even more telling is that Japan actually surpassed the U.S. in value of manufactured exports in 1984.[9]

A review of our trade imbalance with Japan reveals that the majority of Japanese exports to the U.S. are based on high or

medium technology while the majority of U.S. exports to Japan are mostly agricultural, capital goods and natural resources.

This means that key California industries will face even greater competitive challenges in the future. Our seeming areas of greatest strength, (i.e., the development and application of technology to create value-added products) is under tremendous siege.

As indicated by the industrial competitiveness report prepared by SRI International and the staffs of the Senate Select Committee on Long Range Policy Planning and the Joint Committee on Science and Technology, California is losing its comparative advantage in the very industries which must be able to compete and generate the new wealth needed to sustain manufacturing employment and build service sector employment.

We can analyze the strength or weakness of California's industries as the result of a five-stage, continuously cycling process. This process, which may be described as the innovation cycle, consists of 1) basic research, 2) applied research, 3) product development, 4) manufacturing, and 5) marketing.

Each stage must remain strong in order for the process to sustain itself and for our economy to remain healthy.

We stand in danger of losing the innovation which must continue to power our economy. The threat comes from foreign capture at both the front end of the innovation cycle (as a result of tremendous intellectual freedom and targeted investment in areas of strategic inquiry in our universities and research facilities) and at the back end of the cycle (as a result of high quality/low cost foreign manufacturing giving rise to winning marketing).

This innovation cycle currently is in need of strategic assistance at several key points of emerging vulnerability--manufacturing and marketing, and research.

We face, as well, a tremendous risk to the continued viability of the innovation cycle in California from the increasing military orientation of much of our research and development activities. This development, outlined in the SRI report, is having the effects both of skewing innovation away from commercially viable discovery and application and of leading to a "brain drain" in critical skill positions away from commercial enterprise.

BASIC RESEARCH

Basic research is, in the words of Regis McKenna, of Regis McKenna, Inc., the "seed corn" of our future economic strength. It is through basic research that we are able to develop the knowledge base necessary to lead to the creation of new products and processes.

In this area, California already possesses incredible potential. Our public and private universities, coupled with the extensive network of federal laboratories within our State, grant us tremendous advantages.

We must ensure that much of the work performed within these institutions is geared toward the needs of our future industrial competitiveness, increasing our focus on several specific areas which hold great promise for the development of future industries.

We need to focus on new areas of industrial endeavor, such as artificial intelligence, biotechnology and advanced materials (critical in competitive electronics and aircraft manufacture, as well as in revitalizing our construction industry). We must also make a major effort to bring the Superconducting Super Collider, a massive high energy particle physics research project, to California. The Super Collider, if built by the federal government, will be a $4 billion project which will ensure that

this country will be the world leader in research into the very nature of matter itself. Scientific history indicates that the creation of new industries which cannot be predicted today will be among the results of such basic inquiry.

But, of course, that is the nature of the research enterprise. There are no facts about the future. Totally accurate prediction is impossible. It is interesting to note that SRI's 1964 project on California's economic future did not foresee the emergence of the State's microelectronics industry even though it predicted the emergence of a new industry. The following decade microelectronics became the dynamo of California's economy.

Other areas of strategic inquiry--advanced materials, artificial intelligence, and biotechnology--are all demonstratably necessary to our future economic strength. Each is, as well, an area of inquiry in which the Japanese, our most notable competitors, are probably in the lead.

Fortunately for our efforts, each is an area in which the State is already involved. The University of California, as the premier public research institution enjoying oversight by state government, has existing programs of research in these fields.

In Berkeley, as part of the Lawrence Berkeley Laboratory, is a Center for Advanced Materials which receives the great bulk of its funding from the U.S. Department of Energy. This level of funding should be increased by state government and a liaison program for small and medium sized businesses should be established.

In the field of artificial intelligence, significant research is underway at five University of California campuses. The greatest center of activity is in Berkeley. The level of State funding for this area of inquiry should be increased and an advisory group comprised of university researchers and administrators and

industry representatives should be established to bring greater coordination to our activities.

With respect to biotechnology, California has been a world leader. Some of the most successful new biotech firms, such as Genentech and Cetus, call California home. The tremendous potential benefits of biotechnology have led to predictions that it will constitute one of the leading growth industries of the future. As a result, we are now in the midst of great competition with other states and nations to develop the industry.

Although California is the world leader in biotech development, recent events indicate that other states are becoming increasingly sophisticated in gaining biotechnology firms for themselves.

Since biotechnology is still a young industry very much in the research and development phase of growth, it is critical that it be able to rely upon state-of-the-art research and sophisticated education and training programs for biotech development and applications.

Each campus of the University of California currently has some form of biotechnology program, now under the coordination of a system-wide executive committee.

The University's Biotechnology Research and Education Program is designed to foster basic research and to educate and train well-prepared personnel who can meet the needs of industry and science in the field. Grants to campuses and researchers are awarded on a competitive basis.

Unfortunately, the current levels of funding for this field are inadequate to provide for the high quality proposals which have been developed. The mechanism for effective strategic inquiry is

in place. What is needed is an appropriate level of investment to ensure that California remains number one in the field.

What we are really talking about in the area of basic research is making significant social investments in areas of strategic inquiry to build the base for future prosperity. The creation of a scientific base for the development of new products and industries and the revitalizing and sustaining of existing products and industries is absolutely necessary if California is to retain the innovative edge critical to its continued economic strength.

APPLIED RESEARCH

This is the area in which basic science approaches technology. Not surprisingly, the lines between basic research and applied research are not always clear. Most applied research is undertaken by large corporations, building upon work performed by public research institutions and themselves.

In this stage of the innovation cycle, we should encourage more joint university/industry research undertakings, often with proprietary technology as the result.

In both basic research and applied research, we should consider restricting the flow of commercially valuable information to our competitors. All too often, we have seen innovations developed here, as a result of our own ingenuity and social investment, turned into profitable products by foreign competitors. The video cassette tape recorder is a prime example of an American development modified and manufactured by the Japanese for the consumer market.

We should transfer technology from the State's aerospace firms to small and medium sized entrepreneurial firms. Significant

technologies have been developed under government auspices by California's aerospace and defense contractors. Such technology could be licensed to smaller firms, upon the approval of the appropriate federal and corporate authorities, leading to significant new products for the commercial marketplace.

The State can play an important role in facilitating this process through the work of a Technology Extension Service.

PRODUCT DEVELOPMENT

Product development has been California's greatest strength in the competitive arena. This is the stage of the innovation cycle where, so to speak, the rubber meets the road, where the worlds of science and technology join hands with the world of business to create actual products.

California has been at the forefront in forging an entrepreneurial revolution which has led to the world's most effective means of creating innovative products. While this has been and continues to be the case, we cannot take this stage of the innovation cycle for granted. Our strength in this area has kept us competitive.

We need to foster greater transfers of technology from our research facilities in the universities and the federal laboratories to the private sector. We can do this through the establishment of a Technology Extension Service to serve as a catalyst in helping the private sector gain access to the most useful research applications in advanced technology. In this way, we can build on the existing strengths of California's universities, federal laboratories and private firms.

Venture capital has played perhaps the critical role in new product development. Venture capital is risk capital, invested

in exchange for equity in new businesses. It is even, on occasion, "seed capital" invested for purposes of keeping in progress promising product ideas which are no where near ready for market. There is too little venture capital available for the latter segment of the venture market.

While California has, at times, been literally awash in venture capital, the cyclical nature of the venture market and its increasingly short-term orientation provides an opening for the investment of some public pension funds in a patient, strategic manner. This is now allowed by State law. We have over $60 billion in public pension funds in California. A tiny fraction of these funds may be invested in venture capital, as commensurate with the "prudent man" principles of pension fund investing.

MANUFACTURING

This stage of the cycle is deficient in three major aspects--capital (cost and availability), technology (existence and application) and personnel.

We would do well to listen to the words of Massachusetts Institute of Technology (MIT) Professor James Utterback, who has warned: "If you stimulate only science, you help the Japanese more than anyone else."[10]

Our competitors in Japan and elsewhere have not ignored either manufacturing processes or engineering. They have developed the ability to seize control of new products in the final stages of the innovation cycle--through high quality/low cost manufacturing giving rise to efficient marketing--and make those products their own.

The cost and availability of capital have been critical problems for companies wishing to increase or retool their production capacities. While the State should explore the feasibility of a variety of options such as debt/equity packages using pension funds, the creation of secondary loan markets and the use of industrial bonds for modernization purposes, one policy initiative which we should quickly pursue is working with the U.S. Department of Commerce to establish, on a demonstration basis, shared flexible manufacturing facilities to provide common production centers for several small-to-medium-sized firms at a time.

Flexible manufacturing systems are the future of industrial production. Computerized and highly automated, they combine the flexibility of a job shop with the economies of high-volume automation. Such shared facilities, established on a joint lease basis, could run 24 hour a day, shifting production runs to meet the requirements of individual firms.[11]

These facilities would provide economies of scale with far lower capital outlays, increase adaptability to changing markets and reduce entry cost for new product manufacture.

Strengthening our manufacturing competitiveness is perhaps the most crucial element of our competitiveness strategy. This may be somewhat controversial, since some argue that we no longer need be a manufacturing power. This line of argument states that we are the most creative design and marketing people in the world, and that manufacturing is something which can be handled somewhere else by someone else. In this view, California could become a giant research and development park, with most employment needs met by a flourishing set of service industries.

This argument however, is profoundly wrong, for it assumes that a "post-industrial" economy corresponds with a "post-production" economy.

While over 70% of all jobs in California today exist within the context of service industry as opposed to production industry,[12] it is important to remember that a value-added created by manufacturing provides the basis for much of the growth California has seen in industries such as construction, finance, insurance, real estate, transportation, communications, wholesale and retail trade and other business services.

Estimates of the "multiplier effect" of value-added manufacturing value-added and employment vary. The U.S. Department of Commerce estimates that five to fifteen jobs in various fields are created for every new job in high technology manufacturing. Recent research by the Berkeley Roundtable on the International Economy suggests that some 25% of service employment can be considered "tightly linked" to manufacturing. Given the fact that manufacturing accounts for over 20% of California's employment, this would indicate that up to 50% of our employment is directly dependent upon manufacturing.[13] It is particularly interesting to note that the fastest growing service sector of California's economy between 1977 and 1982 was business services[14]--again, they are linked to the success of our producing industries.

Clearly, we must avoid the fate of Great Britain, whose decline as a world economic power was, in many respects, due to its decline in manufacturing competitiveness.

Britain was the first country to take part in the Industrial Revolution of the 19th Century and, as such, was the principal supplier of manufactured goods to the world throughout most of the century. Britain was surpassed by Germany and the United States at the beginning of the 20th century.

British manufacturing suffered from profound policy neglect in subsequent decades. Successive British governments of both parties exhibited an undue fascination with monetary policy during this period, placing great attention to the ultimately unwise idea of restoring the pound.

World War II ravaged the country as well, and rebuilding was neither swift nor timely.

At first, the rest of the British economy did not fare as badly as the manufacturing sector. London was the financial capital of the world during the interwar years and continued as a major world financial center during the post-war era. While the industrial heartland of Britain, the Midlands, languished, London proved to be a flourishing metropolis with a thriving service sector.

Despite the apparent strength of Britain's service sector, the British economy stagnated, with real GNP growing at the lowest rate of any major industrial nation. By 1980, British output per capita and standard of living was only 70% of that of West Germany and France, a dramatic decline which had taken place in the preceding three decades.[15]

To avoid this fate, we must recapture our lead in manufacturing. To do so, we must adopt a system approach to manufacturing, upgrade the education of our workforce, develop a broader base of individuals who possess critical manufacturing skills and, above all, fully integrate advanced technologies into the production process.

Within the University of California system, there are significant manufacturing process programs at four campuses. These programs are admirable in intent and design but require greater levels of funding and overall strategic coordination.

We have a critical need to provide interdisciplinary research and training experiences for our engineers in advanced manufacturing processes. Too few engineers understand manufacturing. There has been far greater emphasis in our engineering schools on <u>products</u> technology than on <u>process</u> technology. We need to develop more engineers with a "hands-on" perspective who are

familiar with the shop floor and can effectively communicate with production workers.

MARKETING

Competitive marketing flows from competitive production. This point aside, we must recognize the need to develop a strong export orientation as part of California's economic policy. This means that we must focus more on marketing our products than on marketing our State.

Following this paper is a separate chapter on the development of an international trade policy for California. This State has emerged as one of the world's great hubs for international trade. This reality can only increase as the Pacific Basin continues to develop as the world's greatest economic dynamo.

It is clear that we must develop a coherent, coordinated policy to aid in the export of our goods and services. This trade policy must exist within the context of ensuring California's industrial competitiveness.

LEADERSHIP

Try as we will with innovative policies in state government, we must recognize that many of the answers lie elsewhere--with other nations, changing technologies and markets, the realities of the private sector and the federal government.

Unfortunately, we have failed to realize the potential of our influence in Washington as the nation's wealthiest and most populous state. There is a great gulf between California and the nation's capital--one of both geography and understanding. Some have, only half in jest, suggested that we open a foreign office in Washington as well as in Tokyo.

Humor aside, we must develop much greater influence on national policy, for of our industrial competitiveness and future prosperity are very much affected by it. Our ballooning federal budget deficits have led to an overvalued dollar which weakens the competitive posture of California's goods and services in global markets. A foreign policy and national security establishment which is unable to secure market access for California products is failing to serve our needs.

Of course, to make our voice heard in Washington, we must make our policy coherent in California. Critical issues must be examined from the perspective of their potential impacts on our industrial competitiveness.

We must develop a focus on these issues in state government through the establishment of an Office of Industrial Competitiveness within the State's Business, Transportation and Housing Agency. This Office should work to ensure the coordination of State programs related to innovation and the competitiveness of our industries, monitor developments in international trade and establish an active California presence in Washington to work with the Administration and Congress in furtherance of the interests of California's industrial competitiveness and expansion of our export opportunities.

The Office of Industrial Competitiveness should work with a California Commission on Industrial Competitiveness, comprised of leaders in the public and private sectors, which would serve as an advisory body examining California's policies and providing a powerful presence in Washington.

With such institutions in place, we can better coordinate today's rather disparate activities, monitor competitiveness trends, assess the results of existing initiatives and develop new initiatives.

FOOTNOTES

1. Science Digest, "The Year's Top 100 Innovations and the Men and Women Behind Them," December, 1985.

2. Erich Bloch, IBM Report on Advanced Manufacturing, National Science Foundation, 1983, page 5.

3. Ibid, page 2.

4. Report of the President's Commission on Industrial Competitiveness, Global Competition: The New Reality, January 1985, Volume I, page 36.

5. Ibid, Volume II, page 175.

6. Washington Post, "U.S. Trade Patterns Shift - Europe to Asia," May 7, 1984, page 1.

7. George Kozmetsky, et. al., Technology Venturing: Making and Securing the Future, Institute for Creative Capitalism, University of Texas at Austin, May 1985, page 19.

8. Ibid, page 152.

9. Ibid, page 20.

10. Robert Reich, "Investing in Strength?", Washington Monthly, June 1984.

11. Erich Bloch, op. cit., page 7-12.

12. SRI International Public PolicyCenter, Meeting California's Competitiveness Challenge, December 1985, page 18.

13. Michael Borrus, unpublished study, Berkeley Roundtable on the International Economy, Institute of International Studies, University of California.

14. SRI International, op. cit., page 18.

15. Data Resources Inc., State of U.S. Manufacturing, 1984, pages 188-189.

POLICY RECOMMENDATIONS: Industrial Competitiveness

POLICY: The State should establish a research agenda.

Implementation Recommendation #1: Establish a Center for Manufacturing Competitiveness within the University of California at a site with both a school of business management and a school of engineering to oversee a coordinated program of manufacturing research and development grants, and to develop and disseminate, through the Technology Extension Service, advance process technology and management practices. It should function as a university/industry consortium, directed by a system-wide executive committee consisting of various campus program representatives, industry representatives, and state economic development officials.

Implementation Recommendation #2: Establish Manufacturing Engineering Centers of Excellence with the University of California and the California State University systems to better train engineers and managers in the manufacturing process.

Implementation Recommendation #3: Establish a "Micro" program for Biotechnology.

Implementation Recommendation #4: Create a California Research Council composed of scientific advisors from California who are elected to the National Academy of Sciences, the National Engineering Academy and the National Academy of Medicine. The Council should establish a research agenda for the state by identifying those areas which are vital and most fruitful for research in maintaining the state's competitiveness and promoting health and safety. The Council shall establish an advisory committee from the private sector and state government.

The Council should establish procedures for reviewing, awarding, and monitoring research grants in the identified areas.

The Council would administer a research fund to be established with state General Funds. Every attempt should be made to secure matching funds from the federal government, the private sector, and universities.

POLICY: Encourage the development of flexible manufacturing systems.

Implementation Recommendation: Pursue establishing a model facility in California with the U.S Department of Commerce.

Evaluate the feasibility of expanding the model by the private sector. Review the need for any governmental incentives or deregulation, if private sector development of such facilities prove infeasible.

POLICY: Enhance the transfer of technology between the State's research institutions and national laboratories and the private sector.

Implementation Recommendation #1: The University of California should develop a computerized bibliography of research papers and on-going projects in all scientific and technical areas. This information should be provided to the private sector so that basic research can be fully explored for further applied research.

Implementation Recommendation #2: The University should establish a Technology Extension Service. The Service would a) broker requests for information from the private sector with University researchers and national research laboratories, b) establish a mechanism for the technical evaluation of business proposals, c) disseminate critical research findings to California-based industries, and d) coordinate with agencies

providing services to small businesses so that entrepreneurs who need assistance in establishing a business can receive such training and assistance.

Implementation Recommendation #3: Review the University of California's patent and licensing policies.

POLICY #4: The State should review the investment priorities of its pensions funds in order to enhance investment in the expansion of business in California, particularly those businesses which need to adopt advance manufacturing processes or upgrade their plant and equipment to remain competitive.

Implementation Recommendation: Establish a Council on Investment Priorities to review and encourage investments of our public pension funds in expanding manufacturing in California.

CHAPTER 3

Agriculture in the State of California

FARMING NOW AND IN THE FUTURE

California is the nation's leading agricultural state. Half of the country's fruit, nuts, and vegetables come from California, where no single crop dominates farm production. With some of the richest farmland and best climate in the United States, California not only supplies grain staples but qualifies as the nation's fruitbasket, vegetable bin and meatcooler as well.

Ranging in location from the Pacific Coast to the Southern California inland to the Central Valley, eight of the nation's top ten agricultural counties are in the State. Fresno County alone surpasses the output of 20 states, producing crops worth over $1.9 billion.[1]

Figure 1

TOP 20 STATES IN 1984 CASH FARM RECEIPTS

Rank 1984	Rank 1983	State	Cash Receipts - 000 Dollars -
1	1	California	13,772,424
2	3	Texas	9,718,454
3	2	Iowa	9,313,771
4	4	Illinois	6,816,840
5	6	Nebraska	6,571,548
6	5	Minnesota	6,083,452
7	7	Kansas	5,899,807
8	8	Wisconsin	5,230,643
9	9	Florida	4,845,146
10	12	North Carolina	4,163,435

SOURCE: USDA, ERS, Economic Indicators of the Farm Sector.

Figure 2

California's Leading Agricultural Counties a/
By Total Value of Production - 1984

Rank 1984	Rank 1983	County	Value of Production - 000 Dollars -
1	1	Fresno	1,924,105
2	2	Tulare	1,389,272
3	3	Kern	1,197,364
4	4	Monterey	1,002,778
5	5	Riverside	993,989
6	8	Merced	840,026
7	7	Stanislaus	805,206
8	6	Imperial	762,291
9	9	San Joaquin	712,318
10	12	Ventura	580,676

a/ Does not include value of timber products.

SOURCE: California Agricultural Commissioners' Annual Crop Reports.

Producing over 250 commodities, California farmers also export over one-fifth of their total production. As a major State industry, agriculture puts three additional dollars in the economy for each dollar of sales. Industry receipts of $13.8 billion in 1983 had an economic impact of $54.4 billion, over 12% of the State's gross product.[2]

High yields and expanded production have been the marks of success for farmers. Until 1985, the diversity of production in the State has shielded the industry from the financial stresses that affected farm-belt agriculture. Now their productivity as farmers have combined with external factors to push the industry to the wall. An overvalued dollar, high-interest loans, declining land values, and falling market prices for ever-increasing production have caused some farm failures and threaten the survival of thousands more. Our agricultural

exports face problems caused by federal policies as well as foreign competition for the international market.

Despite its general health, agriculture in California faces increasing difficulties. Its stability and growth depends on successful confrontation of changing needs and new economic demands. The resource base of California farming is under attack. Irrigated farming faces problems of soil salinity and agricultural drainage, soil erosion, and toxic contamination of aquifers and waterways. These problems cannot be solved on an individual basis but must be addressed if agriculture is to be sustained.

The State must also confront the challenge of training its labor force, including agricultural workers who perform hand labor and fill other jobs requiring few skills, to adapt to an employment market that will differ markedly in the future. Further, federal farm and foreign policies must be monitored and influenced to enhance and not undermine California's interests.

Marketing of California commodities has to become a principal goal of the State's agricultural policy. Information and assistance from the University of California and other state agencies must be better coordinated and attuned to emerging trends and new developments. Farmers need greater integration of information of disparate elements which affect farm planning and management. The significance of the export market demands the State's attention in the formulation of federal policy and trade agreements.

FACTORS SUPPORTING CALIFORNIA AGRICULTURE

California's unique climate and excellent soils in the coastal valleys, plains and near rivers predisposed agricultural development in the State. In the valleys of California's

interior, the fertile soils needed only a dependable water supply to fulfill its promise of high production. Long growing seasons in areas without weather extremes naturally favored the development of farming.

Bolstering the natural conditions for agricultural development is official imprimatur of various governmental policies. Beginning with the Morrill Act which provided land grants to each state for colleges related to agriculture, governmental support developed through numerous university programs. California established a College of Agriculture in 1869 in the newly founded University of California and subsequently enacted legislation for agricultural extension programs which promoted the evolution and development of farming in the State.[3] Federal and state development of water projects and formation of local water districts played major roles in enhancing the establishment of irrigated farming throughout the State.

Experimentation initially conducted by private entrepreneurs such as Luther Burbank became institutionalized in the land grant colleges and agricultural extension services. Community colleges offered agricultural training and established demonstration plots for prospective farmers. Vocational education programs in high schools also provided direct experience through farm-related projects for youngsters interested in agricultural careers.

As roads and highways were built with public funds to serve the general population, they became a major support base for the agricultural industry network. The transportation links between outlying farms, rural centers, and commercial networks facilitate the delivery of commodities, supplies, and equipment between the farm, industrial and marketing centers.

The mix of public policy support and the range of growing climates contributed to the evolution of diversity in the industry. California's farmers and ranchers produce more than

250 commodities, leading the nation in the production of 41 farm products and ranking either second or third in 17 others. Ninety-five percent to 100% of the country's total production of eleven fruits and nuts come from California (almonds, apricots, dates, figs, kiwi, nectarines, olives, pistachios, pomegranates, prunes and walnuts). We also supply the country's total export of raisins and garlic. Other major crops grown in California (over 80% of the nation's production) are processing tomatoes, lemons, plums, avocados, broccoli, and grapes. Generally not recognized as a milk producing state, California ranks second in U.S. milk and cream production; milk is the state's number one commodity.[4]

Figure 3

RANKING AND VALUE, 20 LEADING FARM PRODUCTS, CALIFORNIA, 1983-84

Farm Product	Commodity Ranking		Value a/		Percentage of State Total	
	1983	1984	1983	1984	1983	1984
	- Number -		- 1,000 Dollars -		- Percent -	
Milk and Cream	1	1	1,944,762	1,986,376	14.8	13.6
Cattle and Calves	2	2	1,325,141	1,416,141	10.1	9.7
Cotton	4	3	822,087	1,064,151	6.3	7.3
Grapes	3	4	947,894	847,902	7.2	5.8
Nursery Products	6	5	547,438	720,149	4.2	4.9
Hay	5	6	665,356	651,882	5.1	4.5
Lettuce	7	7	541,803	540,490	4.1	3.7
Flowers and Foliage	8	8	470,021	524,371	3.6	3.6
Almonds	14	9	231,920	470,270	1.8	3.2
Tomatoes, Processing	9	10	392,422	427,145	3.0	2.9
Eggs, Chicken	10	11	371,417	408,821	2.8	2.8
Oranges	11	12	316,699	401,919	2.4	2.8
Strawberries	12	13	279,283	317,453	2.1	2.2
Chickens	13	14	258,018	304,989	2.0	2.1
Rice	19	15	160,699	249,229	1.2	1.7
Potatoes	17	16	183,231	241,683	1.4	1.7
Wheat	15	17	187,916	223,242	1.4	1.5
Broccoli	16	18	183,810	219,951	1.4	1.5
Sugar Beets	20	19	158,308	206,548	1.2	1.4
Celery	18	20	162,376	179,615	1.2	1.2

a/ Based on value of quantity harvested for crops and on value of quantity marketed for livestock and poultry products.

Figure 4

CALIFORNIA FIRSTS

The table below lists 54 commercial crop and livestock commodities in which California leads the Nation. A large number are specialty crops in which the Golden State accounts for most of the U. S. production.

CROP AND LIVESTOCK COMMODITIES IN WHICH CALIFORNIA LEADS THE NATION

Alfalfa Seed	Crenshaw Melons	Lettuce	Potted Plants
Almonds	Cut Flowers	Nectarines	Prunes
Apricots	Dates	Nursery Products	Rabbits
Artichokes	Eggs	Olives	Safflower
Asparagus	Figs	Onions	Spinach
Avocados	Garlic	Oriental Vegetables	Strawberries
Broccoli	Green Lima Beans	Peaches	Sudan grass
Brussels Sprouts	Grapes	Pears, Bartlett	Sugar beets
Cantaloups	Honey	Persian Melons	Tomatoes, Processing
Carrots	Honeydew Melons	Persimmons	Vegetable & flower seeds
Casaba Melons	Jojoba	Pigeons & Squabs	Walnuts
Cauliflower	Kiwifruit	Pistachios	Worms
Celery	Ladino Clover Seed	Plums	
Chinchillas	Lemons	Pomegranates	

Source: California Department of Food and Agriculture

AGRICULTURE 1985: AN OVERVIEW

In the face of four successive years of declining market prices, agriculture remains in a nationwide recession and is struggling to restructure in the face of the new economy. The impact of the global economy first felt by farmers in the Midwest is now hitting California. With U.S. farm debt growth exceeding that of farm income, the international economic environment has become a more critical factor in capitalization and the marketplace. Foreign competition increasingly threatens California's international market shares and penetrates the U.S. market.

The competitive state which naturally occurs is complicated by both foreign domestic policy and American foreign policy. Foreign subsidies for farm production and barriers to U.S. imports, American trade agreements which give preferential treatment to imported commodities which compete with American agriculture, and embargoes and restriction of commodity exports in furtherance of U.S. foreign policy all hurt California agriculture.

Disinflation in land values occurring in the post-inflation economic cycle exacerbates the precarious financial position of farmers whose mode of operation requires annual loan and repayment cycles. Flattened appreciation in real estate in the early 1980s and realization of lower commodity prices together reduced the value of a farmer's major asset: real property. Farmers who expanded during years of peak land value and took on mortgages at high interest rates are in particular trouble.

Land values, and perhaps even operational survival, are further threatened by potential environmental degradation and toxic contamination (e.g. Kesterson Reservoir and the San Luis Drain system.) Multi-million dollar clean-up costs will add to expense of farming operations. Increasing concern about non-point pollution of groundwater (contamination that occurs from no single source) adds to the question of farming sustainability and the economic health of the farmer.

Pressures to maintain economic margins while growing attractive, blemish-free produce which meet consumer preferences have caused farmers to turn to chemicals to control pests and disease and ensure the greatest possible harvest. With increasing reliance on pesticides and fungicides, occasional misuse of some chemicals inevitably occurred, threatening public health and safety. Consumer distrust for farmers and the products they grow thus is generated despite California's reputation for strict enforcement of environmental and pesticide restrictions. California's bounty, which ought to enjoy an unquestionable national and international reputation for cleanliness and healthfulness, thus becomes stigmatized and suspect instead.

The traditional emphasis on production as the hallmark of farming success has caused gluts in many commodities. California agriculture, with efforts supplemented by government policies and research, has clearly been at the forefront of innovation in farming and become a world leader in productivity.

Parodoxically, abundant harvests from increased yields and expanded operations have not raised farmer's net incomes. Production costs have continued to rise as farmers keep up with advances in technology and research with investments in new equipment, seeds, synthetic fertilizers, chemicals and other inputs. As prices for commodities have not moved higher, farm net income in relation to gross income and production costs has continuously declined.[5]

California Farm Debt

The growth and expansion of agriculture in the late 1970s and early 1980s, encouraged in part by inflationary pressures, has abated with the decline of inflation and increased dollar strength. The optimism shared by lenders and farmers that agricultural land values would hold up and U.S. supremacy in world markets would continue was shattered by the realities of international monetary conditions and the development policies of foreign competitors. Falling commodity prices and a general cooldown of the economy has shrunk the value of land, which often has been purchased with borrowed funds and also serves to back short-term production loans. This presents a doubled-edged sword for farmers saddled with high-interest loans and shrinking collateral for new operating loans.

Generalizations are difficult to make in developing the picture of farm debt. In an unpublished paper authored by researchers Vashek Cervinka and Neil M. Koehler, U.S. agriculture was described as the world's major debtor. With a total farm population of less than 8 million, U.S. farmers owe more than $215 billion, as compared with Brazil (population 125 million, debt level $45 billion) and Mexico (population 72 million, debt total $45 billion). Despite a climbing debt load and greater gross income, farmers' net income has only marginally increased.[6]

Figure 5

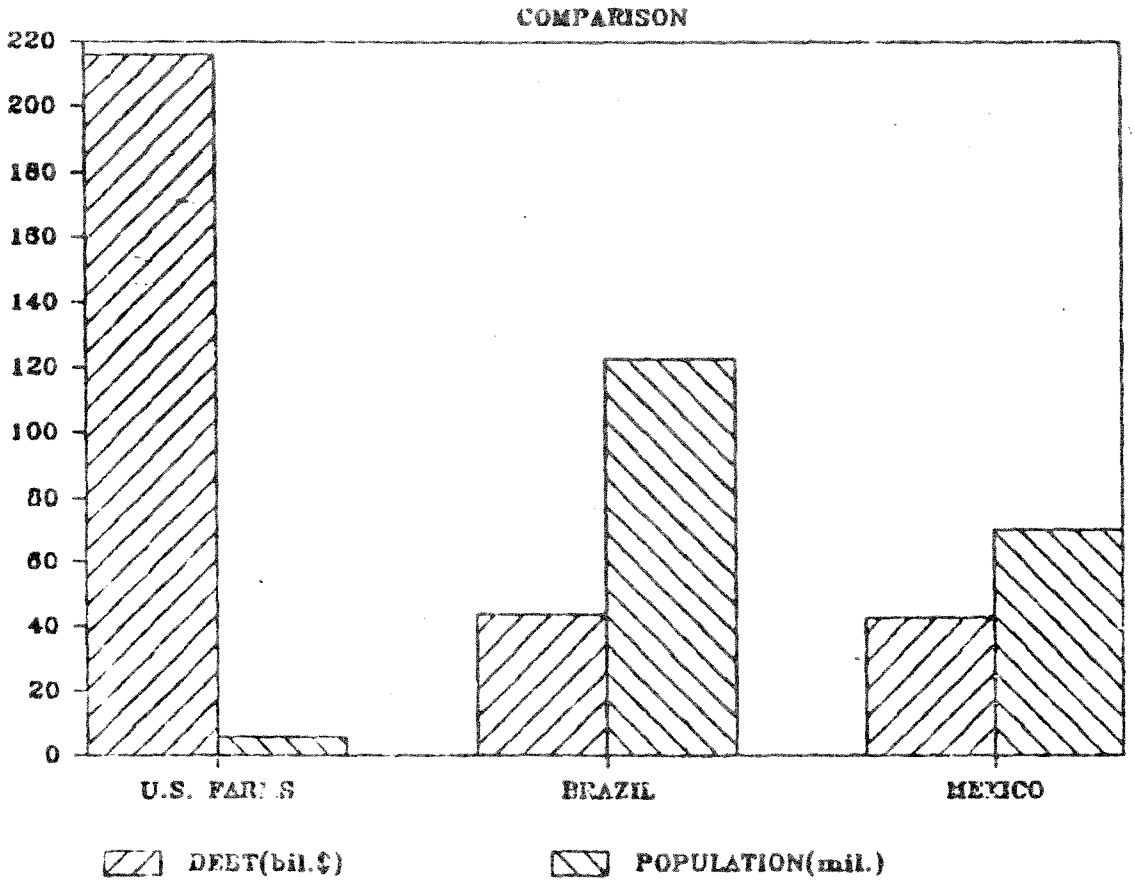
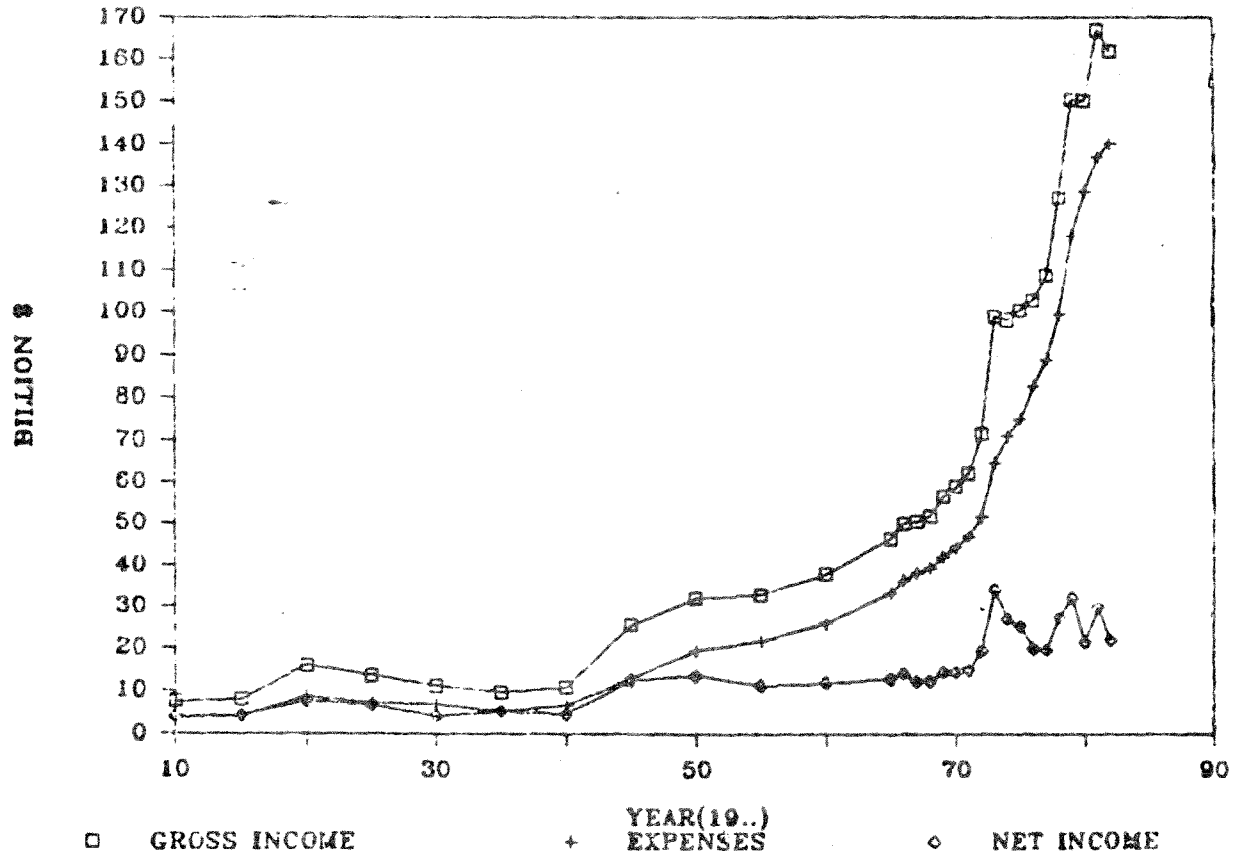


Figure 6



Source: Cervinka and Koehler, Unpublished paper, "Agricultural Prosperity"

In the boom economy of the late 70s when market prices for farm commodities were good, many farmers bought additional acreage despite soaring land prices. As charted by California Department of Food and Agriculture (CDFA), land values for orchards, vineyards and groves peaked in 1981-1982 following good commodities sales years, and dropped precipitously as prices for fruits and nuts fell. For example, in 1982, the market value for raisin acreage in the San Joaquin Valley peaked at $10,840 per acre; Fresno area growers realized sales averaging $1,940 per acre. Two years later, the land value was $6,580 per acre and gross income dropped to $1,324.[7]

Lenders were part of the expansion mentality, making agricultural loans on the value of the assets (which was often land at highly inflated value) rather than the more conservative cash flow basis which had been the guiding principle for agricultural lending. The president of the San Joaquin County Farm Bureau tells of applying for a loan based on the cash flow indicated by his spread sheet and being offered by his banker three times the requested loan using his land as collateral.[8]

Because market prices do not meet their production costs, farmers of all size operations are hard pressed to pay off loans incurred at high interest rates. Major corporations have gone into receivership, full-time farmers have been forced into off-farm employment to support their operations and lenders have foreclosed on many operations.

The federal farm credit system is the single largest agricultural lender nationwide, loaning only to family operations or enterprises whose primary function is farming. In the five western states covered by the Sacramento farm credit district, approximately 40% of all long term real estate loans are carried by the system's land banks; one-third of the agricultural operating loans are made by its intermediate credit banks. The district's land bank losses in 1984 were $8.5 million, the first

significant losses since the 1930s depression. This figure almost doubled in 1985 to $15.4 million out of total outstanding loans amounting to $4.43 billion. Operating loan losses for farming in 1985 were approximately $45 million out of a total loan volume of $2.7 billion. This loss is an increase over the $33 million loss registered in 1984. Only one loss for $3 million was incurred by the system's Bank for Cooperatives in 1985.

Although California's farm debt picture in the federal system is better than the national average, the impact in terms of numbers of farmers and dollar volume is still severe. The number of foreclosures increased from four foreclosures out of 24,000 loans at the end of 1984, to 200 out of 23,160 loans in 1985. An additional 321 loans totaling $236 million were in the non-accrual stage.

These farmers with severe financial problems are not likely to pay off their loans and are facing voluntary liquidation or foreclosure. Officials in the system estimate that approximately 5% of its clients holding loans totaling 10% of the dollar volume will have problems meeting their loan obligations.[9]

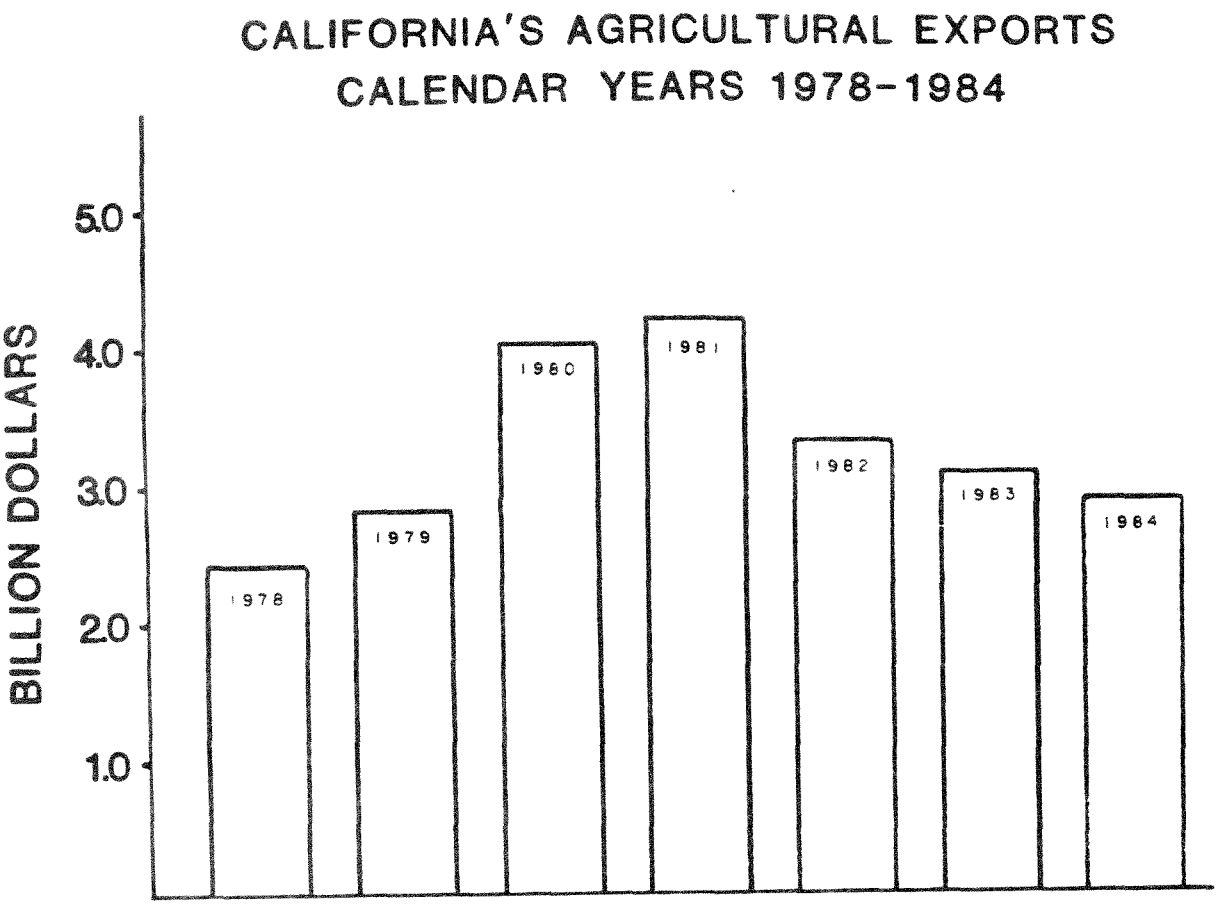
Commercial lenders who hold both real estate and operating loans also find a large number of farmers unable to meet their loan commitments. Even though most farmers have sufficient assets to carry them through the current crisis, farm and financial experts expect the agricultural industry as a whole to be stressed financially for at least another two years.

Farm Exports[10]

Exports are a significant part of the California farm sales picture. One-third of the agriculture acreage supports exports, which now account for more than 1/5 of California farm income.

Our leading exports in 1984 were cotton, almonds, oranges, grapes, wheat, cattle and cattle products, rice and lemons.

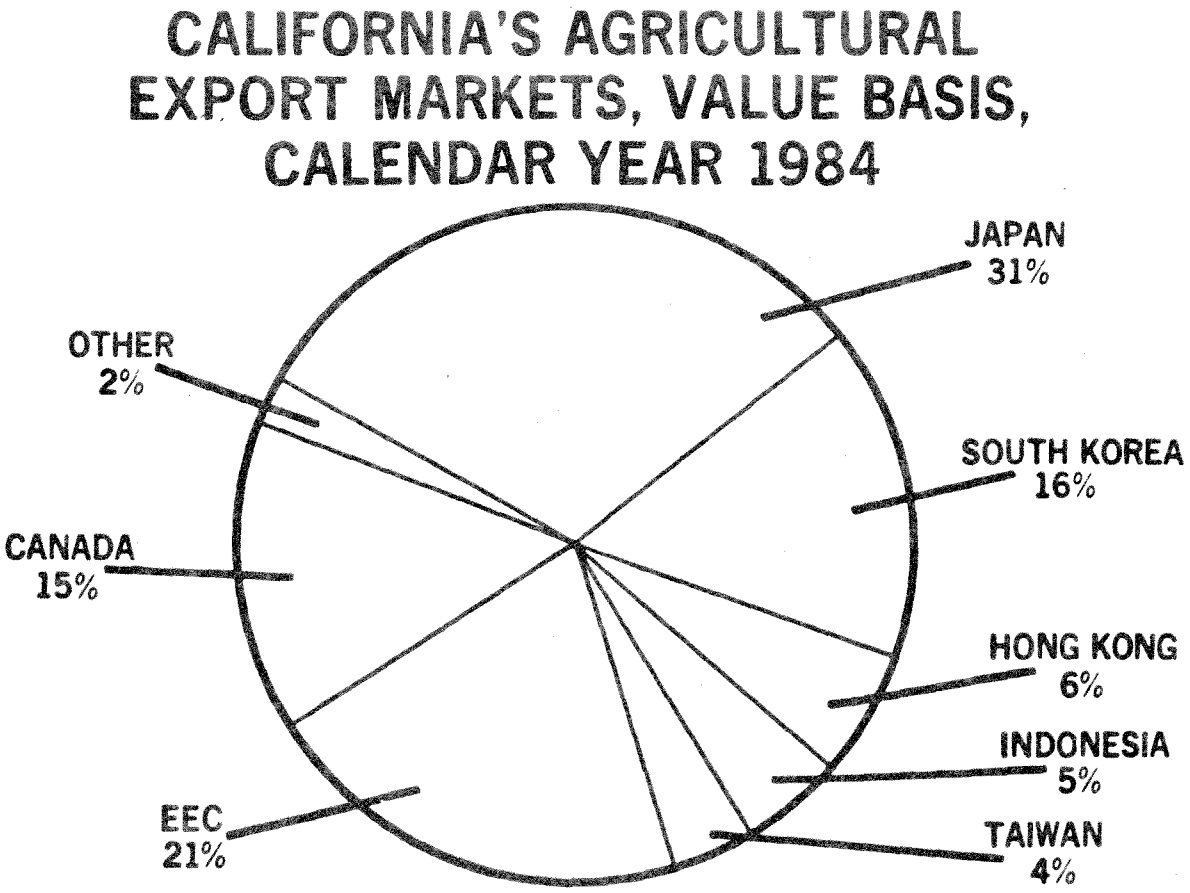
Figure 7



Source: California Department of Food and Agriculture

In just three years, sales abroad jumped from $2.4 billion in 1978 to a high of $4.2 billion in 1981. Declining in subsequent years, farm exports registered a level of $2.9 million in 1984. The total loss of farm export income amounts is just over 30% in four years.

Figure 8



Source: California Department of Food and Agriculture

California commodity export activity in 1984 was characterized by a mix of modest recovery or advances in almonds, wheat and cottonseed and some fruits and vegetables, contrasted with dramatic drops in cotton lint (the State's leading export product), rice, peaches and pears. Despite the gains in exports realized by some major commodities, all are below peaks reached in 1980 or 1981.

Declining sales can be attributed in part to the relationship between the American dollar and foreign currencies. The strength of the dollar has made all American products, including agricultural commodities, more expensive to overseas buyers and thus reduced sales. For example, between 1980 and 1985, the cost

of California almonds to the British consumer doubled, yet the price earned by the almond farmer dropped.[11]

Figure 9

CHANGES OVER SIX YEARS

VALUE OF EXPORTED COMMODITIES PRODUCED IN CALIFORNIA, 1979-84

Commodity	1979	1980	1981	1982	1983	1984
	Value in Thousand Dollars					
Cotton Lint	805,180	1,135,559	989,253	897,021	858,969	624,724
Almonds	286,952	429,817	307,324	236,287	243,167	315,473
Grapes	176,627	230,864	260,766	245,504	212,848	195,216
Oranges	106,429	177,094	204,749	194,153	241,732	217,621
Lemons	97,498	93,210	92,044	82,156	95,302	88,267
Wheat	165,110	283,145	315,844	218,242	72,908	115,491
Rice	147,022	318,808	321,440	111,091	150,618	91,811
Cattle & Products	109,012	91,762	86,695	91,004	75,512	99,836
Prunes	55,117	64,861	71,291	71,407	66,805	63,699
Peaches	62,513	75,372	73,986	59,906	53,209	42,303
Walnuts	54,597	82,957	88,503	77,759	48,277	66,799
Cottonseed	38,366	50,633	54,212	47,723	19,642	50,038
Tomatoes	50,521	43,782	50,648	45,169	40,076	36,637
Lettuce	27,246	29,740	36,709	39,379	37,215	40,266
Alfalfa	33,179	42,276	34,162	32,188	48,179	35,372
Dairy Cattle and Products	30,768	42,277	38,905	37,986	46,388	42,418
Dry Beans	24,879	42,093	45,674	36,034	19,878	25,313
Onions	20,901	28,497	42,448	29,754	28,754	44,811
Chickens and Products	15,539	43,801	36,588	24,970	13,701	14,938
Pears	15,483	18,477	19,602	16,864	13,920	10,425
Celery	14,394	11,476	14,418	15,533	22,411	24,647
Flowers and Plants	14,174	13,052	16,081	14,907	17,449	33,353
Strawberries	12,109	16,374	12,953	21,228	28,676	29,818
Grapefruit	9,676	17,821	18,361	17,457	16,982	9,149
Plums	9,311	13,278	14,591	13,181	11,924	22,534
Total	2,800,663	3,997,823	4,198,165	3,311,305	3,053,163	2,905,042

Further pressure on exports has been exerted by competition from agricultural production in developed countries as well as the shift in developing nations from industrialization toward strengthening of farm production for basic needs and increased self-sufficiency. Recent information shows that global food s shortages as predicted in the 1980 government report, "Global 2000," will not materialize. Basic commodities (wheat, rice, grain, corn) are being grown with success in Third World nations, which are feeding not only themselves but also competing in the world market with exports.

California's international position in some of these commodities has been lost with the transition of previous buyers to exporter. The People's Republic of China, once our biggest cotton importer, now exports 1 million bales annually. India now is able to feed itself; it also exports wheat and rice production above its internal needs.[12] As part of their economic plan for earning foreign currency, the Third World nations in some cases are competing with California in producing specialty crops for export (pistachios from Iran and beans from Mexico, for instance.)

California Farm Size Profile

Although California agriculture has been characterized as an industry of giant corporate agribusiness, the average farm size in California is less than the national average. Most farms are family operated. From 1978 to 1982, the total number of farms grew, with the largest increases coming in farms of 1-9 acres (39.7%) and 10-49 acres (10.0%). Small declines (less than 1.4%) were registered for farms of 180-499 acres and over 2000 acres.

Of the 82,000 farms in 1982, individuals or families operated 65,000 and partnerships ran 11,360. Most of the 4800 corporate farms were family organizations. While the average California farm runs 432 acres, the California non-family corporate farm with 11 or more stockholders is ten times that size. Half of all farmers reported farming as their principal occupation.[13]

The diversity of commodities and the range of sizes of California farms makes it impossible to make credible generalizations correlating commodity production, farm size, type of operation, and gross income. Looking closely at comparative data for farm size and farm sales reveals that the number of farms smaller than 9 acres flourished during the same period that reports of farm properties grossing less than $5,000 annually increased by 28%.

This analysis, particularly when taken in conjunction with figures showing conversion of rural land on the urban fringe into smaller parcels intended primarily for residential use, suggests that many of these small farms are not part of commercial agriculture.[14] However, small commercial farmers feel these operations do compete with them for the local market.[15]

Profiling California farm size by sales gives a picture of the economic distribution in the State. The accompanying figure illustrates the situation pertaining to dollar value of farm sales. Ninety-two percent of the total amount earned by farm sales is registered by fewer than 1/5 of California's farmers. Conversely, less than 4% of the sales total is earned by 58,000 farmers, almost 70% of the number of farms, who each sell less than $40,000 annually. While there is some economic concentration in large farm operations, studies are inconclusive as to this impact on the farming community and general economy.[16]

Figure 10

1982 Profile: CALIFORNIA FARM SIZE, BY SALES

Annual $ sales	Number of farms	% total all farms	% total of all sales
5,000	34,384	41.2%	.42%
5,000-40,000	23,657	28.7%	3.04%
40,000-100,000	8,677	10.5%	4.4%
100,000-249,000	6,925	8.4%	8.6%
250,000 plus	8,740	10.6%	83.2%

Source: USDA 1982 - Census of Agriculture, State Data

Technology and Farming

Farming throughout the world has been undergoing a technological transformation. In California, years of mechanical and technical developments have reduced and changed labor requirements and increased production. New discoveries in fertilizers, pesticides, and other chemicals have increased yields. Innovation in planting, cropping, and harvesting techniques have also raised production levels. Now, a new generation of high technology and biological engineering holds promise of new products and even larger harvests.

Some of these discoveries and inventions are already part of modern farming. Laser leveling, despite the investment expense, is used for precision grading and irrigation efficiency. Irrigation scheduling can be set up with automated systems utilizing moisture sensors. Computers for managing farm-related data are used by farmers of all sizes.

Biotechnologists Ralph W. F. Hardy and David Glass surveyed 50 industrial and academic experts and predicted that biotechnology will have a significant impact on agricultural and food industries before the year 2000. Out of 219 biotechnology companies in the U.S., 28% are pursuing applications of biotechnology in animal agriculture, 24% in plant agriculture, 20% in specialty chemicals and food, and 11% in environment.[17]

Companies across the United States, including many here in California, are on the verge of perfecting or marketing products representing the new wave of agriculture. Recombinant DNA methods have led to gene transfer in petunia cells and successful applications for soya and maize. Ready for field testing are recombinant bacteria intended for frost protection for crops and production of natural insecticidal toxins.[18]

Plants that are salt tolerant, resistant to disease or drought, or selectively tolerant to herbicides are among potential developments of current research activities. Other research leading toward desired alteration of product characteristics has been reported.[19] Overseas, a consortium of scientific institutes, the Consultative Group of International Agricultural Research (CGIAR) has developed a high-yield wheat, and more new CGIAR seed varieties and technology are expected to influence agricultural productivity in developing countries.[20]

Not all of the research will yield readily applicable results nor will the most promising products all be available at once. However, the face of farming is likely to be radically altered by the new technologies and discoveries. Yield increases can be expected, new varieties of commodities introduced, and the potential for lessening environmental problems through substitution of biologically engineered organisms for the present generation of agricultural chemicals exists.

FEDERAL POLICIES AND THEIR IMPACT

Agriculture is significantly affected by federal policies both directly and indirectly. Farm price support programs affect only a few commodities (wheat, corn, cotton, and milk). The federal payout to California farmers in 1983 for these crop supports and other farm programs, including conservation, rural clean water assistance, and the Payment-in-Kind program, was only $372.3 million out of a national total of $9.2 billion.[21] The value of California farm production during that year was over $13.5 billion.

Federal farm legislation as originally enacted in late 1985 which did not restrict conversion of subsidized crop acreage to other crops would have posed a problem for specialty crop growers. The prospect of additional competition from growers of subsidized

commodities, who might have chosen to plant vegetables not covered by federal programs, would have depressed prices in an already tight market.

Federal price support programs enacted to prop up farm income and control production have failed to stem crop surpluses. Despite the USDA Milk Diversion Program instituted in January 1984 to curb milk production nationally, California dairy output increased by more than 3%. Security Pacific Bank economists predicted that following the end of the program in April, 1985, milk production would surge 6% to 8%. Although there are more dairy cattle, greater efficiency due to advances in management techniques account for most of the increased output (in 1980, the average output from 878,000 cows was 15,153 pounds per cow; in 1984, the volume per cow averaged 16,000).[22]

Federal budgetary and monetary policy clearly affect the economic fortunes of farmers. The national tax policy encourages personal spending and provides no incentive for savings. Thus, the personal savings rate of Americans (4% to 6% of disposable income) is insufficient to finance business investments. American business operations and federal budget deficits are thus financed by the influx of foreign capital, strengthening the dollar and making our products more costly to overseas buyers. These factors also serve to prop up the cost of capital.

Foreign policy decisions occasionally have been detrimental for California agricultural interests. The United States subscribes to the Generalized System of Preferences (GSP) which gives preferential treatment to imports from developing countries, impacting California more than any other state because of the broad variety of specialty crops involved. Trade embargoes have resulted in lost markets for U.S. growers. For instance, during Carter administration-imposed sanctions on wheat exports to Russia, Australia stepped into the void and has maintained that international market. Not only did the USSR not need American

wheat, the action also undermined foreign confidence in the reliability of American supplies.[23]

Additional problems are caused by federal requirements for subsidized commodities to be shipped on American flagships, which adds to cargo costs, and international development aid programs wherein American farming experts assist developing nations with production which may end up in competition with California farmers. Recently, under the aegis of the US Agency for International Development, an American agribusiness consultant was in Guatemala studying the country's potential for fruits and vegetables for both fresh and processed markets.[24]

The role of federal water projects in California is significant, both for the thousands of acres of farmland which it brought into existence by flood control and water delivery and for the damage which has occurred from irrigation and drainage in the San Joaquin Valley. The 1984 reform of the Reclamation Act of 1902 also will cause changes in farming as contract negotiations for higher priced water take place.

Pressures for additional water supplies from expanded or new federal projects continue even as the Reagan administration insists on greater local participation in financing construction. Cheap water from federal projects is a major component in the economic cycle of farming operations, both as a necessary input for farming and in its enhancement of the land values (i.e. land with little or no water is worth less.)

TRADE PROBLEMS

As California depends on exports for 20-25% of its farm income, any significant decline in overseas activity hurts the agriculture industry. This is clearly indicated in a recent study by UC Cooperative Extension Economist L. Tim Wallace, who

charted a decline in agricultural exports of over $1 billion between 1980-1984. Because canners and packers are also affected, the impact extends beyond the farm through the retail system and into the economy. Using multipliers developed by university economists, the data show the $1 billion loss translates into a decline in retail economic activity of $2.5 billion. This "worst case" total decrease of $3.5 billion means a loss of 100,000 jobs, most of it in the nonfarm sector of the economy.[25]

The pattern of change in export activity varies from commodity to commodity. External trade factors, such as competition from other nations, foreign subsidies and trade barriers, also affect each commodity in different ways. International trade agreements of which the United States is a signatory often include agricultural commodities in its provisions without any real appreciation of the impact. The General Agreement on Tariffs and Trade (GATT) is a multilateral instrument for regulating trade between nations which account for over 3/4 of international commerce. Despite the significance of agricultural trade, the GATT does not take into account the structure of farming operations and a commodity industry.

To obtain relief from material injury from unfair trade practices, an industry must gather relevant data concerning capacity utilization, inventory declines, employment trends, gross income losses and other financial results. The nature of the investment process in agriculture does not yield the kind of annual profit analysis applicable to other industries. For instance, an orchardist will have years of investment and continuing costs before obtaining any harvest. The scope of many agricultural operations, particularly from growers who cultivate multiple crops simultaneously, and the shape of an industry composed of many small producers further makes the requisite data difficult and expensive to compile and analyze.

Significant media attention has been given to California's trade deficit with Japan and the difficulties of breaking into the Japanese market. The largest importer of California agricultural commodities (over 31% in 1984), Japan restricts the importation of California citrus, nectarines, walnuts, and a variety of other commodities.

Other equally effective barriers and subsidies which hurt California commodities have been identified by industry sources: New Zealand subsidies of up to 40% of its lamb production which is dumped in the U.S. market; Italian, French, and West German subsidies of low-cost wines; Greek raisin subsidies, Australian technical restrictions on imports of California avocados, Mediterranean subsidies of fig production which challenge the dried fig and fig paste industry, and so on.[26] With the entry of Spain and Portugal into the European Economic Community this year, competitive pressure on California agricultural exports is not likely to abate.

Another substantial problem emanates from United States' agreements under the Generalized System of Preferences (GSP), initially authorized by the Trade Act of 1974 and expanded and renewed by the Trade and Tariff Act of 1984, which gives preferential treatment to imports from developing countries. Aimed to enhance industrial growth in these developing nations, the GSP has been burgeoning with the addition of agricultural products in apparent inconsistency with the intentions of the original Act.

As with the GATT procedures, the requirements for protesting product additions or getting commodity deletions are costly, difficult to follow, and largely inapplicable to industry practices. Yet, GSP advantage has been given to products which would directly compete with California commodities, among them lettuce, cabbage, celery, cucumbers, garlic, walnuts, peppers, radishes, apricots, cherries, fig products, and melons. Tomatoes

from Israel may be impacted by future negotiations of the U.S.-Israel Free Trade agreement, which has as its goal the total elimination of all trade barriers between the two nations. Israel already exports a significant portion of its commodities in direct competition with California agriculture. The Caribbean Basic Economic Recovery Act similarly will enhance the production and importation of agricultural commodities to the U.S.[27]

California clearly needs a voice in influencing United States trade negotiations with other nations. The State's agricultural industry, different from that of most agricultural states but linked through its diversity with farm interests in states such as Texas and Florida, must be persistent in getting acknowledgment and consideration for its unique needs.

CHANGING MARKETS

Changing dietary preferences as new medical research and nutritional information develops has caused a shift away from some products which have been mainstays of the agricultural industry (from beef and canned products to poultry and fresh fruits and vegetables, for instance.) **Further, as more family units evolve into one parent constellations, dual parent employment and singles who live alone, an increasing interest will be exhibited in easy-to-prepare or ready-to-eat foods.**

Pressures from foreign competition on processed foods have cut into market shares for canned fruit and vegetables. Some domestic companies have relocated abroad and are also competing directly with California growers and food processors. The evolution of consumer preferences and entry of foreign processors in domestic and international markets has resulted in a shrinkage in the canning and processing industry.

From 1977 through 1984, company consolidation or closure affected 26 plants, resulting in a net loss of over 20,000 cannery jobs. Since 1979, the California food processors have dropped production by 20%.[28] That loss follows a 30% drop in domestic consumption of canned fruits between 1970 and 1980.[29] The bleak future caused by import competition to California's apricot industry, which uses sulphur during processing of dried apricots, is further threatened by the prospect of prohibition of added sulfites in all foods.

These pressures and developing health concerns among educated consumers signal an impetus for applied research. The research capabilities of the University system can be utilized to conform food commodities to dietary standards and consumer preferences, to invent or develop new processing technologies for foods, and even to create new food products which are amenable to current lifestyles.

The traditional value-added food products coming out of California's packing and processing industry is losing its competitiveness. Unless research and development efforts are directed toward innovation in value-added products and innovation in processing which meet a changing market and economic demands, the industry and production agriculture, which supplies our basic food, will continue to suffer.

Export markets are not necessarily identical to the American market. Consumer preferences in a foreign market may differ from that of Americans and require different packaging, methods of presentation, or even taste. Wheat growers learned that the Chilean market for California hard red winter wheat meant different milling processes and preparation if sales were to occur.[30] In countries with high economic growth rates, increases in per capita income mean market opportunities for specialty food items. American marketing intelligence, research capabilities, and farmer orientation have yet to fully explore the opportunities for overseas sales.

FARMING AS AN INTEGRATED SYSTEM

The foregoing discussion clearly illustrates the multiplicity of factors which affect agricultural operations as well as the broad effect farming prosperity has on the economy. **Environmental considerations are as inextricably linked as markets, yields, and technology to agricultural farm operations, affecting both the short term profitability and cost picture and the long term sustainability of farming.**

The Land Base

A study recently completed by the American Farmland Trust (AFT) shows that urban pressures for development in California have resulted in loss of some of the best soils in the climatically blessed coast and coastal valleys, thus reducing the overall agricultural production potential of the State. The report also cites figures from the United States Soil Conservation Service showing a California loss of soil totaling 256 million tons annually from wind and water erosion throughout the State, an amount which would fit a cube measuring over 1/3 mile on each side, or enough to fill 1700 Houston Astrodomes. Erosion affects 1.8 million acres of irrigated and dry-farmed croplands (about 16% of the total) and 7 million acres of grazing land (more than 1/3 of the acreage.)[31]

At present the production capacity of existing farm operations exceeds the market need. But as economic pressures for conversion of rich farmland to housing near desirable urban areas continue, it becomes important to know what is left and to ensure the most efficient farming of the remaining land.

In 1980, the State began a program of mapping farmland in every county. Administered by the Department of Conservation, the Farmland Mapping and Monitoring Program uses data from the federal Soil Conservation Service soil survey, which categorizes

soils in eight different classifications according to growth-sustaining physical properties. Completion of the mapping would give a clear picture of 1) the pattern of development and conversion of agricultural land to nonfarm uses and 2) the location and amount of land in the four soil classifications (Types I-IV) judged suitable for farming.

This information is important for monitoring trends in farmland conversion and determining appropriate actions and priorities for protecting and enhancing the productive capacity of the remaining acreage. Five years after its inception, the farmland mapping project is still incomplete, due in part to inadequate staffing and funding. Its progress is further impeded by reliance on old soil surveys in use at the time the federal government reduced funding for updating soils information.

At this time California has no soil conservation plan, though a Soil Conservation Advisory Committee for developing a plan has been formed in cooperation with the federal Soil Conservation Service, the State Department of Conservation and local Resource Conservation Districts.

Soil Salinity

During the crisis following the U.S. Department of Interior's shutdown of drainage into Kesterson Reservoir in 1985, the fragmentation of research responsibilities and gaps in information became apparent.

Multiple studies on selenium and agricultural drainage problems have resulted in the creation of multi-level interagency teams under the aegis of the San Joaquin Valley Drainage Program, a cooperative effort by state and federal agencies for information exchange and coordination of activity. The State Department of Water Resouces was directed by the Legislature in 1985 to summarize on a quarterly basis all ongoing agricultural drainage studies in the State.

The University of California, a member of the Program's interagency technical coordinating committee, has also coordinated its research scattered on various campuses. Other member agencies working in the Program are California's Resources Agency, Department of Water Resources, Department of Food and Agriculture, State Water Resources Control Board, Central Valley Regional Water Quality Control Board, California State University, and a host of federal agencies including the Bureau of Reclamation, Environmental Protection Agency, United States Fish and Wildlife Service, and the United States Geological Survey.

Various studies pertaining to selenium, such as groundwater hydraulics, soil studies identifying distribution of selenium and geochemical processes controlling concentration of soil elements in water, will yield information necessary to protect groundwater, fish, and wildlife. The research should also point toward irrigation and crop management techniques which are consistent with principles of soil and water protection.

The formation of the interagency teams appears to be working well insofar as the present Kesterson/Westlands drainage question is concerned. However, information gaps identified by members of technical committees often remain unresearched because of the diffusion of authority within the teams. For instance, water quality experts raising questions about crop uptake of trace elements, soil characteristics, or other subjects outside their agency responsibility have little leverage in effecting research and data collection on other subjects.

Though answers to the selenium problem are now being sought, we should be looking at other potentially troublesome elements in the soil in order to avoid another crisis. A permanent administrative mechanism with a lead state agency responsible for coordinating with federal agencies and the academic system on environmentally-related agricultural issues should be developed.

Information Systems

Information to assist farmers in crop and irrigation management decisions is currently available from a variety of sources. The Department of Conservation and the Federal Soil Conservation Service both have maps showing agricultural acreage, soil characteristics, climate, and crops grown. Within the Department of Water Resources, the Office of Water Conservation operates the California Irrigation Management Information System (CIMIS).

CIMIS, developed in cooperation with University of California Cooperative Extension, integrates weather station information, soil type, and crop data to assist farmers with specific information on water application rates and timing. The Department of Water Resources additionally collects and analyzes information on groundwater levels and energy costs.

Though in operation for a number of years, CIMIS only recently contracted with a few regional organizations covering only parts of the State to facilitate the transmission and use of the data to local farmers. Farmers confronted with a multiplicity of data sources would benefit from coordination of available data and assistance in obtaining the right kind of information. CIMIS is a start toward that kind of information dispersal.

Similar needs exist with respect to general farm management. In looking at information required by farmers, particularly in this era of depressed agricultural prices and financial pressures, agricultural economists from the U.C. Cooperative Extension on the Davis campus found that farmers, ranchers, lenders and planners were hampered by the absence of timely, integrated information on farming and marketing economics. Even with the collection of seemingly disparate data at hand, many farm managers and other personnel dealing with farm economics are unequipped to coordinate the numbers and economic principles into well-planned management approaches necessary to deal with agriculture in a global environment.[32]

The wealth of information from a variety of sources has been found to be overlapping in some subjects and inadequate in others. As a result of their recent study covering the condition of California's agricultural land resources, AFT recommends better data gathering and information sharing on every major resource question--soils, salinity, water, and farmland preservation.[33] This information is critical not only for individual farmers and the industry as a whole but also for policymakers and governmental officials who must take long-term view.

University Research

Research within the University of California related to agricultural production and marketing, food sciences and nutrition is conducted primarily by units within the Division of Agriculture and Natural Resources, which includes the Agriculture Experiment Stations, Cooperative Extension, and nine field stations. Seven broad program classifications designated by the United States Department of Agriculture cover the research projects which are selected.[34] The resulting mix of projects reflects a combination of the capabilities and interests of faculty members, researchers, and the availability of specific funding rather than Division goals within any kind of coordinated framework.

An examination of the allocation of resources in University research reveals the underlying emphasis on agricultural production for both basic and applied research. The University of California Agricultural Policy Task Force in 1978 identified a shift beginning in the 1960s away from basic scientific research to more mission oriented projects.

The research programs of the Division of Agriculture and Natural Resources and the proportion of funding spent during the 1975-76 and 1984-85 fiscal years are as follows:[35]

	1975-76	1984-85
1. Renewable Natural Resource Conservation Management	14.3%	12%
2. Environmental Enhancement and Recreation	14.3%	11%
3. Production Capacity and Efficiency of Domestic Plants and Animals	27.3%	26%
4. Product Improvement and Marketing	9.5%	9%
5. Protection of Plants and Animals	27.4%	29%
6. Family and Consumer Welfare	10.0%	13%
7. Community and Economic Development	1.1%	1%

According to the University Task Force, the goal of research in Production Capacity and Efficiency is an increase in productivity and the food supply. The Task Force also notes the objective of Product Improvement and Marketing is the restraint of food prices to the consumer and assurance of nutritional quality, and product safety.[36]

Relatively little change has occurred over the last decade in the proportional distribution of funding among the seven program categories. Despite trends which have been developing since the late 70s (declining number of mid-sized farm operations, increasing productivity, economic pressures on the food processing industry, environmental pressures), changes in funding levels in the program areas do not reflect the expanding scope of emerging problems.

A reallocation of funds to provide more expenditures for applied research in product development and/or improvement, new food processing technologies, better marketing and a concomitant lessening of emphasis in production capacity is warranted. Even as efforts to equalize trade relationships and monetary equity succeed, growers will be faced with the need to adapt to changing market conditions as agricultural industries abroad strengthen and become more competitive and new technology adds to domestic production capabilities. Research and development efforts are significant in facilitating and enhancing that adapation.

The Task Force also observed that guidelines are needed to maintain "crucial lines of basic scientific inquiry on which long-range food production depends" and for "new lines of applied research."[37] Direction established by policy makers and a research agenda identified by a California Research Council would help address that issue. The Council, composed of scientific advisors from different disciplines would identify those areas which are vital for maintaining the State's competitiveness across the broader economic spectrum and for promoting health and safety. (Recommendations for a California Research Council are discussed further in Chapter 2--Industrial Competitiveness)

Agricultural Chemical Applications and their Implication for Farming

The federal government preempts State authority in the establishment of pesticide tolerance standards on raw agricultural commodities. Thus, all California standards for pesticide residue on fruits, vegetables, and other crops emanate from the Environmental Protection Agency, except for new pesticides which may as yet be unregulated. California may, and does, exercise its police powers to protect the health and safety of its citizens by enacting laws governing applications of chemicals and other substances to soils and crops.[38] The usage of certain chemicals which jeopardize the health of workers or which can contaminate the water supply are prohibited.

Farmers allege, with some justification, that they are at a competitive disadvantage with commodities grown abroad without these restrictions. Various methods ensure that imported commodities meet the pesticide residue standards required of all products including those of California origin. Shipper certification of pesticide residues can be required as an enforcement mechanism. Responsibility for inspection of imported commodities is dispersed through mutual agreement among the federal, state, and county governments. Sampling of imported commodities according to prescribed standards generally takes place at the point of entry by federal inspection officials.

Agricultural commissioners in the destination county have the authority but are not required to inspect products. State inspection for pests consists of visual inspection for surface pests at State-line border stations. Sampling for pesticide residue conforms to what is described as an "ongoing marketplace program," meaning what is being imported and purchased by consumers. In this effort, samples from commodities in wholesale markets as well as retail specialty markets may be tested. Where residue levels exceed established tolerance levels, the products are traced through the marketing system and embargoed from sale.[39]

Inspections for plant health are also required as a protection for domestic industry. Recently the California Grape and Tree Fruit League learned that the shift by the federal Animal and Plant Health Inspection Services from a two percent to a one percent sampling method led to the arrival of fruits from France showing excessive levels of pear leaf blister moth. Although the two percent preclearance inspection procedure has been reinstated, the question of the adequacy of the data base for selected inspection level remains.[40] This issue has implications for the standards of inspection followed for other fruits and vegetables as well.

The State is powerless to prohibit importation of commodities grown under methods prohibited in California unless the food products do not meet California health standards at the time of receipt. Thus, where international agreement is absent on the prohibition of certain practices, such as the use of DBCP as a soil fumigant, the State should have the federal government address these issues on an item by item, case by case basis in bilateral trade agreements. The profitability of the American market for foreign sales offers some leverage in negotiating these issues.

The use of fertilizers, pesticides, and soil amendments in farming cuts two ways, creating conditions which may immediately enhance yield and crop quality, but which may through cumulative effects in the long run degrade the environment and threaten individual and public health. Higher costs due to increased inputs are absorbed within the crop production system; they are neither reflected in consumer food prices nor in the prices earned by the farmers.

Dropping since World War II from 28%, the proportion of the disposable income in the U.S. as a whole which is spent on food needs has stayed around 19% since the late 70s, far less than the expenditures in other nations.[41] For each consumer dollar spent for food, less than 1/3 has consistently gone to the farmer despite price increases in energy and other inputs.[42] The public's desire for unblemished produce is being met, but we are not paying the costs incurred by farmers to get that produce. Other costs, however, in health, environment and sustainability are becoming apparent.

Indications of a need to carefully monitor use of chemicals in agricultural production clearly exist. Toxicity of pesticides to humans, the evolution of pesticide-resistant pest strains, and pollution of aquifers and water supplies by pesticides, plant nutrients, and soil additives all necessitate continued research

on methods of commodity production which would reduce dependence on chemical use.

In their report on non-point contamination of groundwater, staff from the Assembly Office of Research (AOR) determined that little integration existed between the University of California's Integrated Pest Management (IPM) Program headquartered on the Davis campus, the two Divisions of Biological Control in Berkeley and in Riverside, the University's Departments of Agricultural Economics, and the U.C. Santa Cruz Agroecology Program which is under the jurisdiction of the Division of Social Sciences at UCSC. Evaluating the pertinent U.C. Agricultural Research Program, AOR found that little IPM funding has gone to biological control research. Of 30 research projects funded by the IPM program in 1983, only one was conducted by the Division of Biological Control.[43]

Furthermore, none of the 18 members of the IPM Technical Committee which identifies research needs and approves research proposals was from the Division.[44] The separation of the U.C. Santa Cruz Acroecology Program out of the Division of Agriculture and Natural Resources further isolates its activities and impedes integration of its research into a composite body of information which addresses the issue of pest control with minimal chemical inputs.

Integrated, complementary systems of crop production management through IPM, biological control, and agroecology could positively impact the economics of farming. The interrelatedness of these farming methods should further be examined by the Departments of Agricultural Economics for their relevance and application to commercial farming. With costs of farm production increasing and the potential for environmental contamination ever present, greater focus has to be placed on minimizing inputs for the benefit of farmers, workers, consumers, and the general public.

The Council for Agricultural Science and Technology (CAST) issued a report in May 1985, discussing the effects of agricultural chemicals with relation to groundwater. The group of scientists from throughout the United States representing disciplines across the agricultural spectrum concluded that information about the behavior of agricultural chemicals in the environment is inadequate.

Among the specific needs cited are information on the movement of agricultural chemicals through soil and into groundwater, management techniques to reduce the potential for downward movement, improved methods for assessment of hydrogeologic and environmental variability, mathematical models for computerized projections of long-term movement of chemicals, and improved communications of research findings to the public.[45]

Communication Networks

"To make effective decisions on California's agriculturally oriented policy problems during the 1980s and beyond, a communication network is needed to link existing and potential clientele, the scientific community and public policymakers at all levels."[46]

This statement from the U.C. Agricultural Issues Task Force Report in 1978 still holds true today. The literature on current agricultural issues and interviews with farmers and others involved in agricultural production points to the wealth of information pertaining to farming and farm operations from myriad and overlapping sources, gaps in information despite the quantity of data available, lack of coordination in researching problems and developing solutions, and the absence of a systematic, integrated method of dissemination of information to farm clientele, researchers, policymakers, and the general public. Additionally, during the past year, as recognition developed about the agricultural community's emerging trade problems,

individual growers and grower organizations expressed a need for a forum to bring the issues to the attention of the public and policymakers.

Further demonstrating the need for better communication between sectors of the farming and non-farming public is the adversarial position often taken by factions in discussions on water and soil conservation. Proponents of drip irrigation as a farming technique may be unaware of the leaching requirements of the soil; conservation tillage proposed for erosion control may increase nitrate loss to groundwater, making it less desirable under certain circumstances than conventional tillage. Farmers who follow traditional production methods are unfamiliar with the practices of operators who manage their farms with alternative techniques. Consumers have little understanding of the relationships between farm profits and food prices. Innovators, lacking an audience and financing, face difficulties demonstrating the efficacy of their ideas or practices on a scale which would enable wider adoption of techniques to improve farming efficiency.

The very diffuse nature of data collection, the complexity of technical information, and the multiple agency responsibility for factors involved in crop production underscores the difficulty of ensuring the dissemination of appropriate information to farmers. Bulletins, newsletters, and other publications issued by public agencies, commodity groups, membership organizations, and other groups all report on research, technology, or technical developments. Farmers would benefit from coordination and improve accessibility to that information and its analysis in a coherent fashion.

What about Water?

The rich potential of much of California's farmland was realized with irrigated agriculture made possible by development of water projects and delivery systems. Surface water from distant impoundments substituted for groundwater pumping in some cases and supplemented natural rainfall in others. Bringing and maintaining agricultural land into production was always seen as a positive social and economic force, particularly when the world as a whole was faced with the prospect of unmitigated hunger.

California's role as a food supplier to the hungry nations which still exist is minor in proportion to its total agricultural production. We grow and export primarily specialty food commodities. Our major staples--rice and wheat--no longer play major roles in world hunger as many other nations have become self-sufficient.

A report published by the Institute of Governmental Studies argues that DWR projections for future water demands do not adequately account for the variables that impact agricultural fortunes and the development of commodity production.[47] In the current situation, production is already outstripping sales. Environmental problems pertaining to irrigation and drainage also affect the amount of water which will be needed. How much water is needed for production? Will more water be needed for leaching salts out of the soils? How will the drainage problems be solved? Where should water be applied, to present lands, or new plots of farm acreage? How can efficiency of water use be maximized? What is the role of water in attaining the proper balance between production, environmental needs, and cost? How much will be needed?

All of these questions beg for answers and point to the need for good information and a review of the State's water policy which supports increased water supplies and implies for continued

agricultural growth. Factors of population growth, demographics, and the amount and quality of agricultural land need to be considered. The future of water project planning could be enhanced with accurate analyses of the future status of agricultural production and the role of water.

FOOTNOTES

1. California Department of Food and Agriculture, California Agriculture-1984, July 1985.

2. Security Pacific National Bank, California's Agricultural Trends and Issues, February 1985.

3. Editor, Ann Foley Scheuring, A Guidebook to California Agriculture, University of California Press. 1983.

4. California Department of Food and Agriculture, Annual Bulletin: Exports of Agricultural Commodities Produced in California, 1984, October 1984.

5. Vashek Cervinka and Neil Koehler, Unpublished Paper, "Agricultural Prosperity," August 1985.

6. Cervinka and Koehler, ibid.

7. California Department of Food and Agriculture, California Agriculture-1984, op. cit.

8. Conversation with Michael Machado, farmer in Linden, San Joaquin County, November 1985.

9. Information from Kenneth Billings, President, Federal Land Bank, Fresno and A. Craig Nielsen, Senior Vice-President, Farm Credit Banks of Sacramento.

10. Commodity export figures are from California Department of Food and Agriculture, Annual Bulletin: Exports of Agricultural Commodities Produced in California, 1984, October 1985.

11. California Department of Food and Agriculture, op. cit.

12. Ward Sinclair, "Does the World No Longer Need our Farmers?", The Sacramento Bee, January 1986.

13. United States Bureau of Census, 1982 Census of Agriculture--State Data, 1983.

14. American Farm Land Trust, Eroding Choices, Emerging Issues; 1986.

15. Conversation with Michael Machado, op. cit.

16. United States Bureau of Census, op. cit.

17. Ralph W.S. Hardy and David J. Glass, "Our Investment, What is at Stake?", Issues in Science and Technology, Spring 1985.

18. Norman Goldfarb, "Revolutionary Promise of Biotech on the Farm," ECN Fertilizers and Agrochemicals Supplement, Feburary 18, 1985.

19. American Farmland Trust, op. cit.

20. Ward Sinclair, op. cit.

21. United States Department of Agriculture, Economic Indicators of the Farm Sectors, 1983.

22. Security Pacific Bank, op. cit.

23. The Report of the President's Commission on Industrial Competitiveness, Global Competition: The New Reality, Volume I, January 1985.

24. Agland Investments Services, Inc., correspondence, October 4, 1985.

25. L. Tim Wallace, Agricultural Economist, Unpublished Report, University of California Cooperative Extension, 1985.

26. California World Trade Commission, Report to the Legislature: Agricultural Trade Activities, August 30, 1985; Agricultural Council of California, A Perspective on the Importance of International Trade to California Agriculture, September 1985.

27. Ibid.

28. California League of Food Processors, "Summary of Food Processing Plant Closures from 1977 to Present," June 12, 1984; "1985 California Pack Statistics," February 1986.

29. John D. Cox, "Changing Times Hurts State's Canneries," Sacramento Bee, August 9, 1982.

30. California Wheat Commission, California Wheat, September 1985.

31. American Farmland Trust, op. cit.

32. James H. Cothern, "An Abstract: A Program to Improve Agricultural Managers Financial Management Capabilities," University of California Cooperative Extension, December 1, 1985.

33. American Farmland Trust, op. cit.

34. University of California Agricultural Issues Task Force, Agricultural Policy Challenges for California in the 1980s, Special Publication 3250, University of California, October 1978.

35. 1975-1976 figures are from University of California Agricultural Issues Task Force, ibid.; 1984-85 figures are from the Office of Dr. Lowell Lewis, Director, Agricultural Experiment Station, University of California.

36. University of California Agricultural Issues Task Force, ibid.

37. Ibid.

38. Opinion #23348, Legislative Counsel of California, November 4, 1985.

39. Telephone conversation with James W. Wells, Chief, Pesticide Enforcement, California Department of Food and Agriculture, January 1986.

40. California Grape and Tree Fruit League, On Target, November 29, 1985.

41. Western Livestock Marketing Information Project, "Allocation of Personal Consumption Expenditures," December 10, 1984.

42. "Farm Value of Food Drops," San Francisco Examiner, December 1, 1985.

43. Assembly Office of Research, The Leaching Fields: A Non-Point Threat to Groundwater, March 1985.

44. Mary Louise Flint, Focus: IPM Research, 1985 Annual Report, University of California Statewide IPM Project, 1985.

45. Council for Agricultural Science and Technology, Agriculture and Groundwater Quality, Report #103, May 1985.

46. University of California Agricultural Issues Task Force, op. cit.

47. Zach Willey, Economic Development and Environmental Quality in California Water System, Institute of Governmental Studies, University of California, Berkeley, 1985.

POLICY RECOMMENDATIONS: Agriculture

California government must take a more active role in supporting agriculture with new or modified programs which help farmers meet changing needs and new economic developments. The State's public universities should be an integral part of the effort, providing research, analysis, information and other educational programs, including helping to coordinate meetings and conferences. Increased access to management training and information which will enhance farmers' capabilities as entrepreneurs as well as their success as growers should be encouraged.

As the federal government diminishes its funding of resource protection programs and signals its intent to reduce price support programs for major commodities, it becomes imperative for California to take a lead role in ensuring the health of the State's agriculture industry. The significance of the export market further demands the State's attention, particularly in the formulation of federal policy and trade agreements.

POLICY: **A primary goal of the State's agricultural policy shall be to enhance the domestic and international marketing of California's fresh and processed agricultural products.** In promoting exports of farm commodities, attention must continue to be given to the 80% of California's production which is sold domestically.

Implementation Recommendation #1: Give priority to applied research by the University and state related agencies on the development of new consumer products, new uses for commodities, and processing technologies which will increase sales and enhance the marketability of California commodities.

Implementation Recommendation #2: Give higher priority in the allocation of state financial resources to projects which have a market orientation, conserve the resource base of agriculture, or protect the public health and safety. Require an educational component which ensures the distribution of research findings.

Implementation Recommendation #3: Conduct research and disseminate information on the agricultural marketing systems to expand options for small and medium sized growers. The University's Cooperative Extension should increase the marketing expertise of its staff by developing forecasting techniques and skills. Data collection and analysis of markets should be encouraged through the use of existing state and federal news services.

Implementation Recommendation #4: Develop greater public/private partnership for research in areas identified by economic analysis as vital in maintaining the industry competitiveness.

Implementation Recommendation #5: Review the State's water policy which historically promotes new water supplies and thus implicitly encourages the development of additional agricultural acreage and production. The review should include an analysis of whether new acreage and increased production would be beneficial for growers and the State.

Implementation Recommendation #6: Ensure the adequacy of inspection of imported fruits and vegetables for chemical residue, plant health and pest control to guarantee conformity to standards required of commodities grown within California.

POLICY: Promote research and educational programs which decrease costs, advance resource conservation, protect public health and safety, and minimize usage of agricultural chemicals in rural and urban California.

Implementation Recommendation #1: Develop a systematic method for data collection, including coordination and analysis of agricultural natural resource-related studies and research conducted by local, state and federal agencies. Report annually to the Legislature the compilation of the resultant information on soils, soils management, irrigation practices, chemicals and other inputs which affect drainage, groundwater problems and sustainability of farming.

Implementation Recommendation #2: Support acceleration of studies on growing methods, including integrated pest management and biological control, to decrease use of energy and chemicals, enhance understanding of the ecology of the State's agriculture, and sustain the viability of California farm operations.

Implementation Recommendation #3: The Cooperative Extension shall develop and make available coordinated analyses of research pertaining to soils, cropping patterns, water content, and other pertinent data relevant to decisions on irrigation systems and other agricultural practices which can minimize environmental costs and maximize agricultural entrepreneurship.

POLICY: Encourage improved communication and linkage between sectors and interests involved in California for greater policy input.

Implementation Recommendation #1: Facilitate the development of a coalition of agricultural producers including specialty crop growers which meets regularly to advise the Legislature on marketing and other agriculture issues.

Implementation Recommendation #2: Sponsor under the State aegis biannual conferences to facilitate and encourage communication and other linkages between policy-makers, production farmers, processors and packers, technology interests, consumers, environmental groups, and others with specific or general interests in agriculture.

CHAPTER 4

Trade in California's Future

CALIFORNIA'S TRADE PROBLEM

California's unacceptably high trade deficit has exploded from $2.1 billion in 1980 to $17.1 billion in 1984 and seriously jeopardizes California's economy. The absence of any State trade policy leaves our market shares defenseless in the face of aggressive import penetration, declining industrial productivity, misguided federal policies, and the strength of the American dollar. Without the guidance of a cohesive, well-formulated State policy, the State's trade activities scattered throughout several governmental units are reactive, ill-defined, and haphazard.

The world's fastest industrializing countries in the Asian Pacific Rim are increasingly successful in the international arena and in our domestic market. Our complacency, in the face of stiff Asian-Pacific competition and growing aggressive activity by other states to capture Asian markets, sacrifices the potential for California to become the undisputed hub of the Pacific Rim.

California's economic supremacy and geographic advantage by themselves are insufficient to overcome the complexities and challenges of global interdependence. We must unify disparate responsibilities of government under policies which recognize and deal with the emerging realities of increasingly active and successful foreign competition.

A comprehensive trade policy should embody an export orientation for the State's industries and focus on the expansion of export opportunities for California's small and medium-sized businesses. Trade itself must be viewed in the broader context of industrial

competitiveness, requiring the coordination of the State's trade functions. The State must also enhance the capabilities of its citizens to function in an interdependent global society and economy.

California's voice must be loud and clear in the formulation of federal trade policy. But we must not rely on federal export and trade promotion to meet California's needs. Federal resources should be utilized, but State programs should extend assistance and fill service gaps to California business interests.

An umbrella policy with goals of promoting California's industrial competitiveness and international role can give added impetus to programs already in place and provide the framework for new strategies to improve our trade performance.

AN OVERVIEW OF THE STATE'S TRADE

California is the country's leading export state. A highly educated and skilled workforce, training and research institutions among the finest in the nation, diverse manufacturing and agricultural industries, progressive and strong financial institutions, and a location on the Pacific Coast with natural seaports which are part of a sophisticated transportation network are all factors which position California well for its trade activities.

In 1983, more than $38.5 billion in the State's business income and tax revenues was generated by California trade; an additional $10.5 billion in economic activity came from salaries for over one million jobs in export-related production and service industries.[1] We lead the nation in export-related manufacturing employment, which in California accounts for one out of every seven jobs. The State's 1981 volume of $27.4 billion in export sales totals more than 10% of the national volume of sales to foreign trading partners.[2]

A GLANCE AT CALIFORNIA TRADE

Figure 1

1983 CALIFORNIA TRADE IMPACTS

- $35.0 billion in business revenues
- $3.5 billion in tax revenues
- $10.5 billion in wages
- 1,000,000 jobs in manufacturing, agriculture, and service
- From 1977-1983, 80% of all new jobs were export-related

Source: World Trade Commission

Figure 2

CALIFORNIA EXPORT LEADERSHIP, 1981

- First in export related sales
- $27.4 billion in export sales (10% of U.S. total)
- 276,000 California jobs in export manufacture
- 14.5% manufacturing workforce due to exports
- 228,000 other California jobs are export related
- Leads U.S. in exports of four major manufacturing industries
- Among top ten in nation in 14 other major industries
- One of top three agricultural commodity export states

Figure 3

ARE WE A COLONIAL NATION?

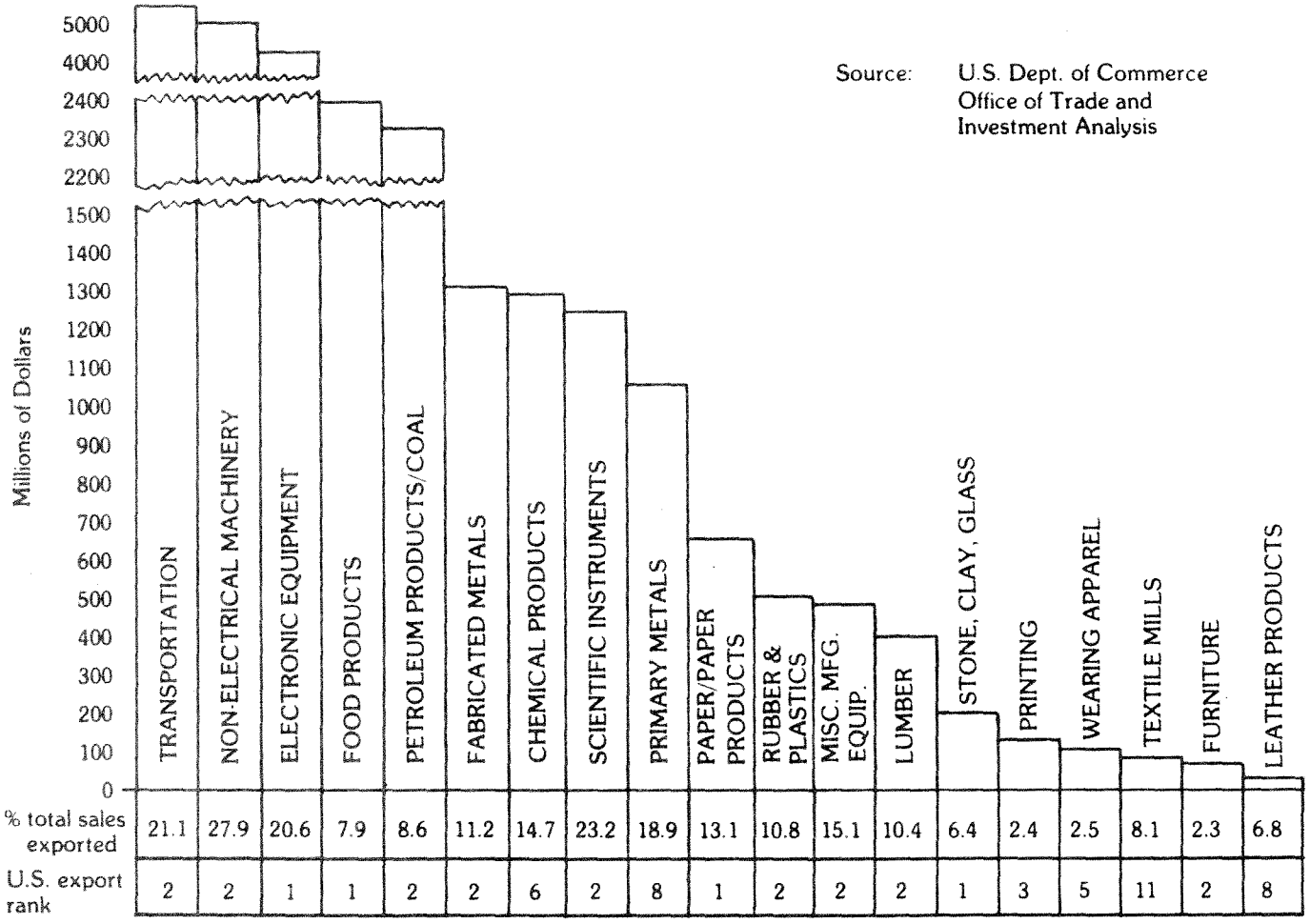
WHAT WE IMPORT	WHAT WE EXPORT
television sets	agricultural products
VCR's	boilers
small electronics	data processing equipment
wearing apparel	aircraft and spacecraft
sporting goods	non-electronic motors and engines
toys	opticals and scientific equipment
motor vehicles	electrical machinery and equipment

- We import consumer products to futher individual pursuit of the good life
- We export raw materials and basic industrial manufacturing components which further the development of the buyer's economy.

California ranks among the top ten American states in the exportation of products manufactured in 18 out of 20 major industries.[3] Furthermore, California is one of the top three agricultural export states, selling abroad more than 20% of the State's farm output and over 77% of the country's total exports of fruit, nuts and vegetables.[4]

Figure 4

CALIFORNIA EXPORT-RELATED SALES, 1981



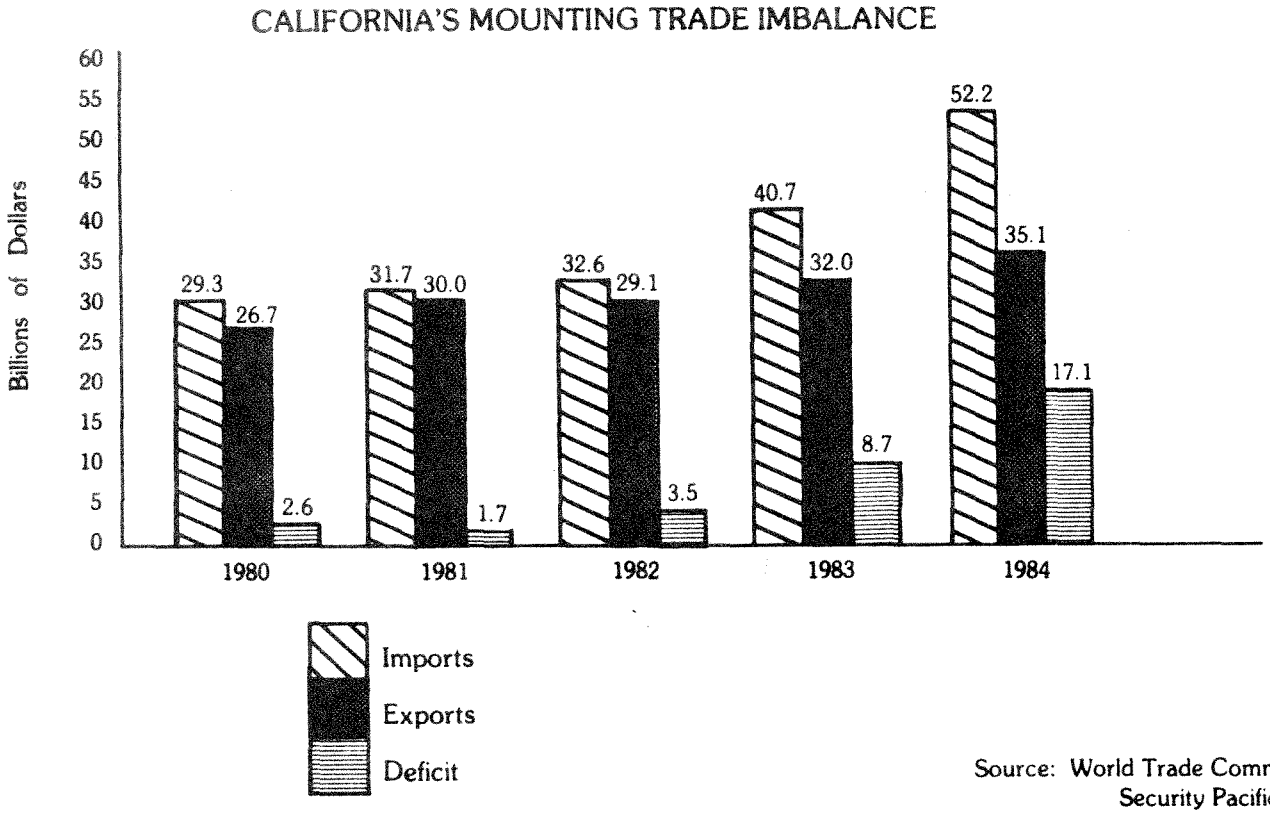
On the whole, California's traded products profile tends to resemble that of the United States. Imports to California are oriented toward consumer goods (TVs, VCRs, and other electronic products, wearing apparel, sporting goods). Exports are mostly

capital goods, natural resources and agricultural products. Two-thirds of the 1983 and 1984 value of California exports are products and commodities which further the buyer's economic interests and promote their industrial growth--automatic data processing machines, boilers, non-electric motors and engines, aircraft and spacecraft, opticals and scientific instruments, petroleum and natural gas, raw agricultural products (including cotton and wheat) and electronic machinery and equipment for further assembly.[5]

Through the end of 1983, the explosion in California's trade deficit overshadowed the modest rise in the volume of exports. California's exports show more than a two-fold dollar increase between 1978 and 1981. However, the increase has a high inflation factor. In terms of 1972 dollars, the value of 1983's $37.9 billion California imports was only $14 billion; exports totaling $29.4 billion were worth only $12 billion.[6]

California's trade volume during the 1980s measured by Customs District Data has showed dramatic increases, fueled by rises in imports. In 1980, the California trade total of $56.2 billion showed a deficit of $2.6 billion. In 1984, after gradual rises in the intervening years, both total trade volume and trade deficit jumped. Trade volume amounted to $86.1 billion; the deficit climbed to $17.1 billion, almost double the record deficit of $8.7 billion set the previous year.[7]

Figure 5



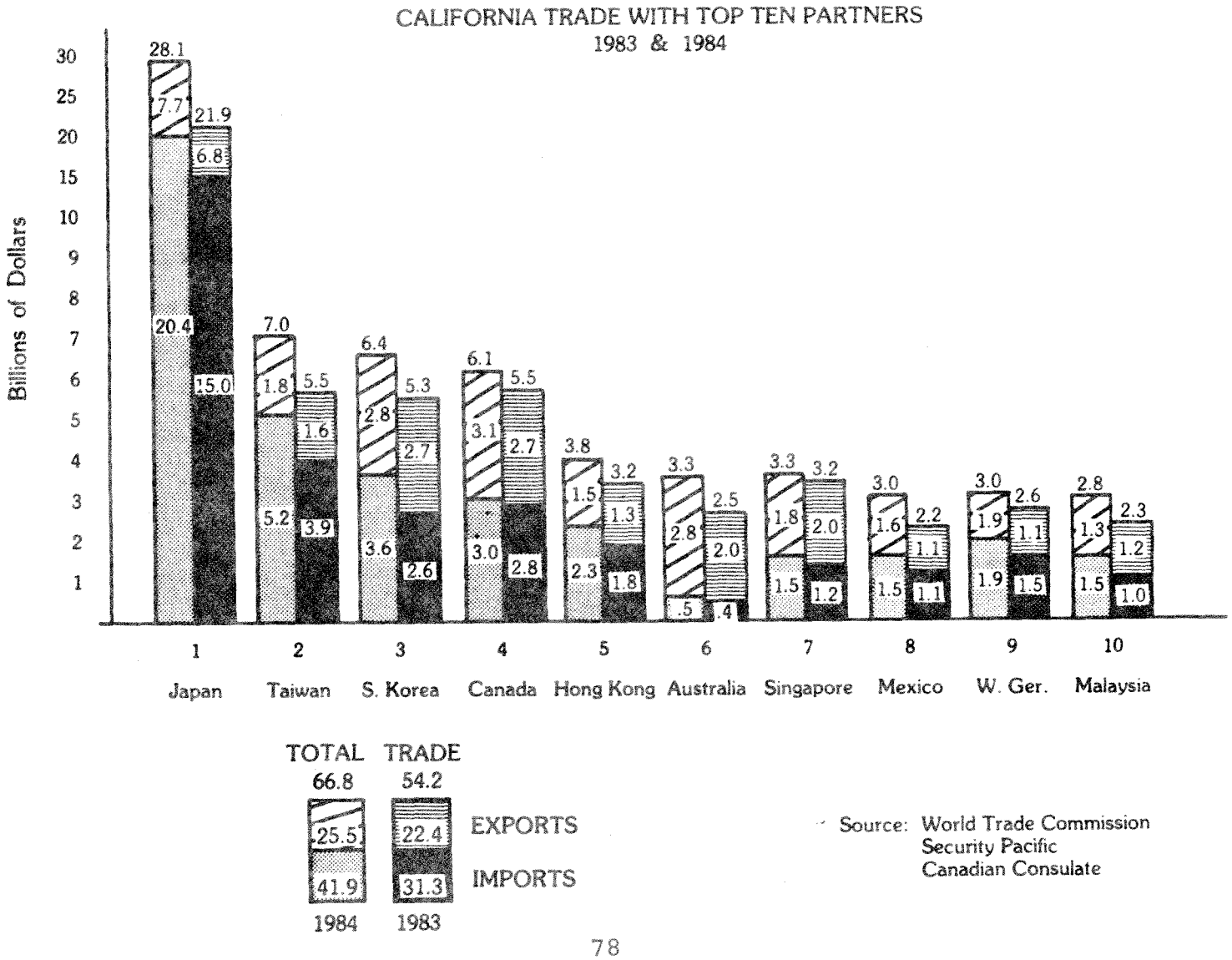
Source: World Trade Commission
Security Pacific

Most businesses are unaware of existing possibilities for exporting and their own potential for international trade. Various sources estimate the number of firms in the United States with export potential ranges from 11,000 to 20,000. According to the U.S. Commerce Department, less than 15% of all companies nationwide export; one percent of all manufacturing firms (most of which are on the Fortune 500 list) account for 80% of the exports.[8] **Extrapolating from the 11,000 nationwide figure given by the General Accounting Office, the Executive Director of the California World Trade Commission estimates at least 1,100 California businesses could become new exporters.**[9]

CALIFORNIA'S TRADING PARTNERS[10]

During 1984, approximately 3/4 of California's trade occurred with nations of the Asia-Pacific region. This level of trade activity with countries from this region, which includes six of the State's top ten trading partners, underscores the State's importance as the gateway to the Pacific. Since at least 1982, the ten economies trading most with California have remained the same although positions on the list have changed. The following discussion summarizes the activities with the State's leading trading partners, by region, in 1984.

Figure 6



Source: World Trade Commission
Security Pacific
Canadian Consulate

Asian Pacific Region

Japan consistently accounts for most of the State's trade activities. High technology products, including machinery and mechanical equipment, electrical equipment and transportation equipment make up most of California's exports to Japan. Consumer electronics, office machinery, electronic components and consumer goods such as motor vehicles and wearing apparel constitute the major Japanese imports. Japan also absorbs one-third of the State's farm exports.

Taiwan moved up from its 1983 ranking, increasing its total trade volume with California from $5.5 billion to $7.0 billion. As the State's second leading trading partner in 1984, the island economy exported to California $3.4 billion more than it bought, increasing the trade imbalance $1.2 billion over the previous year. Taiwan purchases electrical machinery and equipment and consumer electronics from California and exports wearing apparel, consumer goods such as luggage, and recreational products (sporting goods, bicycles and toys).

California trade with Korea grew from a slight surplus in 1983 to an $800,000 deficit in 1984. South Korea's export growth edged it past Canada in total trade with California, moving from its fourth ranking in 1983 to third in 1984. South Korea buys more electrical machinery and equipment than Japan from California; the Koreans also purchase substantial amounts of aircraft parts and cotton. A nation which relies heavily on foreign exchange to reduce its huge foreign debt, its sales to California include consumer electronics, machinery, and wearing apparel.

Three other Asian trading partners in California's top ten are Hong Kong, Singapore and Malaysia. The primary export from Hong Kong, which ran up an $800 million California deficit, is wearing apparel. California trade with Singapore, with a product profile resembling that of California/Taiwan, showed a

surplus of $300 million. Malaysia, the tenth ranking trading partner, caused a California trade deficit of $200 million in exporting raw products (oil, rubber, timber, palm oil, tin) and importing machinery, manufactured goods, and food products.

North American Region: Canada

According to trade figures from the Canadian Consulate, Canada's trading volume with California shows a small surplus of $100 million out of a total of $6.1 billion. Our northern neighbor purchases a large share of California farm commodities and high-tech products. Nationally, Canada is the United State's most active trading partner, accounting for a total of $113.4 billion and a U.S. deficit of $20.4 billion. It is second in volume only to the Japan/U.S. total of $94.0 billion and a deficit of $36.8 billion.[11]

Australia/Oceania Region: Australia

Trade volume between Australia and California totaled $3.3 billion in 1984, an $800 million increase over the previous year. The Australian government's purchases of computers, medical equipment, defense items and transportation equipment fuels its $2.8 billion imports from California.

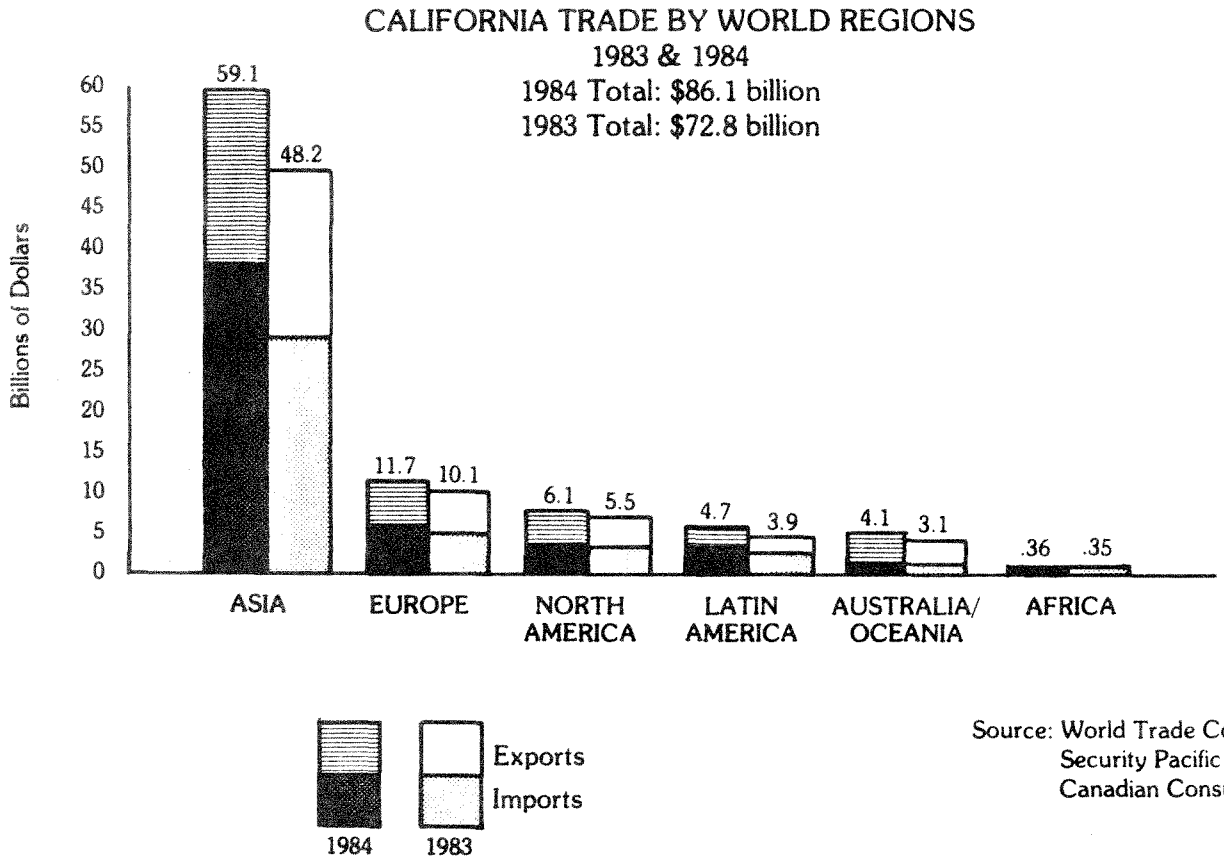
Latin American Region: Mexico

Fairly even trade activity between Mexico and California grew by approximately 1/3 to a level of $3.1 billion in 1984. Mechanical and electrical equipment, and machinery and transportation equipment are the State's leading exports; primary imports include recreational goods, fresh vegetables, electrical machinery, and iron and steel products. While future trade activity is dependent on Mexico's external debt management and pressures from the International Monetary Fund and the World Bank, the outlook for increased trade with Mexico is generally positive.

European Region: West Germany

West Germany, the only European nation in the top ten, occupied the ninth rank in 1984. The volume of both exports and imports increased, as did the California trade deficit which climbed to $800 million. Capital goods--mechanical machinery, electronic equipment, instrumentation and transportation equipment--account for most of the two-nation trade.[12]

Figure 7



Source: World Trade Commission
Security Pacific
Canadian Consulate

PACIFIC RIM POTENTIAL

The nations of the Asian-Pacific Rim will likely continue to have the world's greatest rate of economic growth in the next decade. Although the rate has slowed from the 5%-10% range which

characterized the first half of this decade, these countries individually and in the aggregate present the greatest trade opportunities for American business.

The phenomenal economic development of the city-state of Singapore, which is the driving force behind the Association of South East Asian Nations (ASEAN), which also include Thailand, Malaysia, Indonesia, and Brunei, shows a potential for continuing importation of capital goods. Moreover, governmental policies adopted by many of the Asian nations foster an export orientation and create a socio-economic-political climate which fuels high savings and investment rates, agricultural growth, and industrial development.

The national diversity of the region and their own intense competition with each other (and particularly with Japan) probably reduces the likelihood of an European Economic Community (EEC) type relationship. However, some leaders, such as Saburo Okita, the former foreign minister of Japan, foresee the emergence of greater regional cooperation and unity in international relations.[13] Opportunities and economic possibilities for California exports presented by the continuation of Asian domestic industrial advances, increases in per capita income, and attention to infrastructure cannot be ignored. At the same time, we must also recognize the potential competitive threat for international market shares presented by individual Asian nations as well as any union of mutual interests.

With some aggressive activity, California's trade with other partners in the Pacific Rim--Latin American nations and Canada--can also grow. The volume of California exports to most of the South American nations dropped from $3.92 billion in 1983 to $2.83 billion in 1984. During the same period, imports rose $146 million.

Because of its position as a creditor nation to Latin American nations and as a country with a large trade deficit, the United States must work with the World Bank and the International Monetary Fund as plans are developed for the economic recovery of the debtor nations. California must monitor and influence those plans. Exporting helps the debt-ridden countries earn capital to strengthen their own economy and repay their debts. Even under current austerity conditions, some nations need the raw commodities and equipment available from California. Thus, the potential for exports from California will be present even as Brazil, Mexico, Venezuela and others establish and implement their recovery and debt repayment programs.

Canada, on the other hand, already has a strong economy whose market poses opportunities for tapping by California exporters. Relatively even trade volume, with modest annual increases, grew from about $4.5 billion in 1979 to $6.3 billion in 1984. Though American sales to Canada are valued at $46.5 million ($22.9 million more than U.S. sales to Japan), California accounts for less than 7% of the national export volume. California's 1984 exports of $3 billion ranks only fourth among states in two-way trade with Canada, far outstripped by Michigan ($8 billion), New York ($5 billion), and Ohio ($4.7 billion).[14] In 1986, California will be participating in the International Exposition in British Columbia and the State should aggresively work with private enterprise to capture a larger share of the Canadian market.

INTERNATIONAL AGREEMENTS AND THEIR EFFECT ON CALIFORNIA

Several multilateral agreements regulate sales of products to buyers in foreign nations. The major systems of international agreements which govern trade activities affecting California exports are the Generalized System of Preferences (GSP) which has been reauthorized by Congress until July 4, 1993, and the General

Agreement on Tariffs and Trade (GATT), a multi-nation trade agreement covering 3/4 of the trade between most of the nations of the world. Important to the high technology industry is a third multilateral agreement, the Coordinating Committee for Multilateral Export Controls (COCOM), which reviews sales to communist countries.

Generalized System of Preferences

The GSP governs agreements by industrialized nations to facilitate industrial development in newly developing countries. Under the GSP, 3,000 products from 100 countries receive preferential import treatment into the United States. To retain duty free treatment for a product under the GSP's competitive need provisions, for instance, the product may not exceed 50% of the value of U.S. imports of the product.

A country's eligibility for GSP depends on a per capita GNP less than $8,500 and adherence to free trade and other discretionary practices related to market access. U.S. intellectual property rights and certain "internationally recognized worker rights" must be protected. The GSP reauthorization legislation also bars as GSP eligible new products in the leather-related product sector (shoes, handbags, luggage, etc.)

As originally conceived, the GSP embraced primarily manufactured goods, but more and more agricultural products have been added to the list. The requirements for protesting additions to or requesting removal of products on the list are written for manufactured products and are poorly suited to agricultural commodity production and marketing systems.

General Agreement on Tariffs and Trade

The General Agreement on Tariffs and Trade (GATT) is an international agreement involving 90 industrialized and

developing nations covering about 3/4 of the world's trade. Founded in Geneva in 1947, GATT objectives are the promotion of fair international trade. Seven rounds of talks since its inception have resulted in a system of principles and mechanisms which purport to ensure market access and prohibit unfair trading practices. Domestic industries which have been harmed by industry subsidies, product dumping, unfair tariffs, and other activities of GATT signatories may petition for relief.

The complicated, costly, and time-consuming procedure, which begins with a complaint filed with the International Trade Commission of the United States, often is not effective even in cases where GATT decides in favor of the complaining industry.

For instance, the citrus industry received a favorable ruling from GATT in January, 1985 for relief from a discriminatory tariff established by the European Economic Community (EEC) for some of its Mediterranean members. Further, the refusal to grant relief in accord with the GATT decision gave rise to the so-called "pasta war", where the United States threat to impose countervailing duties on imported Italian pasta brought new retaliatory tariffs on American walnuts and lemons. A negotiated deadline of November 31, 1985 for settlement of the pasta/citrus dispute between the U.S. and the EEC has passed without resolution.

Most media attention has focused on market access problems in Japan, and agricultural business pages have reported on charges of unfair trade practices levied against European countries. Less well known is that many of our major trading partners protect service activities, which are not covered under GATT, with both informal practices as well as formal tariff and quota barriers.

As examples, Italy allows no foreign-produced television commercials, the United Kingdom imposes restrictions on foreign accounting firms, Japan prohibits foreign retail banking and export rediscounting, France rebates cargo taxes and airfare taxes for use of domestic carriers, Canada imposes a quota on foreign TV programs, and West Germany has a monopoly on insurance.

Among the categories of barriers on imports of services followed by major trading partners are import quotas, which are both numerous and complicated; selective tariffs and barriers which are both explicit and non-explicit, such as discriminatory legal requirements for foreign firms; "buy domestic" restrictions which give substantial preference and rebates for services provided by domestic firms; export and patent restrictions which open foreign copyrights and patents to exploitation; domestic regulatory actions which impose various limitations on foreign companies; limitations on banking and financial services, including establishment of banking branches; subsidies and restrictions on transportation and distribution services as well as subsidies of domestic industry.[15]

Overcoming years of resistance from other developed nations seeking to protect their service industries from international restraints, the United States has finally succeeded in lobbying GATT and the international trade community to have services included in the next round of talks which should begin in 1986.

With the development of the service industry in California and the potential for California-based financial institutions, insurance companies, film-making companies, advertising agencies and so forth to penetrate into markets abroad, getting multilateral agreement on regulation of services is important to California.

Coordinating Committee On Multilateral Export Controls (COCOM)

COCOM membership includes Japan and all the NATO countries except Iceland. An organization not governed by any international treaty but with a strong NATO alliance, COCOM's primary function is the clearance of applications for technological sales to communist countries--signatories of the Warsaw Pact, Vietnam, Mongolia, North Korea, Albania, and the People's Republic of China (PRC). Intent on preventing sales of equipment and technology which can be used for military purposes, COCOM's workload has increased because of the blurring of demarcation lines between civilian and military technology and the warming diplomatic climate between the PRC and western nations.

United States companies have flooded COCOM with export applications; 89% of the 3,122 license requests in 1984 were for sales to the PRC. The overload on COCOM clearance capabilities has resulted in six to eight month waits for export licenses. COCOM recently eased restrictions on about 1/5 of the categories it monitors and agreed to put its lists of embargoed products under a continuous review system.

Defense concerns and differing U.S. attitudes toward the PRC and the USSR complicate negotiations within COCOM on dealing with export rules.[16] With its high tech manufacturing industry, California has a significant stake in expediting export clearances and resolution of problems involving specific product sales.

Other Treaties and Agreements

The Caribbean Basin Initiative is an innovative package of trade, aid, and investment incentives designed to promote economic growth in the Caribbean and Central America. With the elimination of duties beginning January 1984 on all imports to the United States, the products of the region, particularly

agricultural commodities, compete with California's farm exports and domestic sales.[17]

Bilateral free trade area agreements may be negotiated between the United States and other countries, subject to Congressional approval. The U.S.-Israel Free Trade agreement, working toward the removal of tariff and non-tariff trade barriers between the two nations, is another example of foreign policy which may have deleterious effects on California industries. Israel, for instance, is a producer of wheat, citrus, olives, flowers, artichokes, apricots and tomatoes, all of which are major California commodities. **Eventual elimination of tariffs and other preferential treatment of Israeli agricultural commodities could threaten the export and domestic market share of these California products.**[18]

Canada and Mexico are also interested in negotiating free trade area agreements. Since both nations manufacture or grow products which could compete domestically and internationally with California interests and protect their own industries with tariffs and subsidies, it is important to provide information to federal trade negotiators and monitor the progress of the talks.

Federal law allows the President to take independent action through the United States Trade Representative to gain access to markets abroad or equalize trade relations with foreign partners. The leverage which the United States could exercise from its vantage point as the world's most desirable market has not been used to great advantage.

For instance, opportunities exist to negotiate a level playing field for agricultural commodities. California farm commodities grown under strict environmental standards must compete with cheaper foreign produce grown under methods and conditions that may jeopardize farmworker health and safety and/or pollute the environment. A stronger federal insistence on more equal growing

conditions could help California commodities compete on a more equitable basis. A similar strategy could be applied for manufactured products.

FEDERAL POLICIES AND PROGRAMS

A mix of federal tax, fiscal and monetary policies all affect the conduct of trade. The present result of those policies has been negative for American trade performance.

A federal tax policy which offers no incentive for personal savings but conversely rewards a credit-based lifestyle has yielded a predictable result--a consumption-oriented society whose low savings rate yields only a limited supply of capital to fund private commercial and industrial enterprise. With its massive budget deficit, the federal government competes for this small pool of money. Foreign investors, cognizant of our need for money and attracted by our political and economic stability which guarantees a safe haven and good interest rates for their funds, fill the finance gap for industrial and governmental activities.

The resultant foreign investment has strengthened the dollar in relation to foreign currencies. With the dollar's high value, U.S. products became more expensive overseas and imports are less costly to the American buyer. As our prices rose, foreign buyers found other nations as suppliers or substitutes. The combination of more expensive American products abroad and cheaper imported products has been a significant factor in our overall trade imbalance.

Meeting in New York in late September 1985, the finance ministers of the United States, Britain, France, West Germany and Japan (the Group of Five), agreed to work toward lowering the value of the dollar and attaining greater monetary equilibrium with other

currencies. **However, actions to cause a dollar decline, with its multitude of interrelated effects, must be carefully structured to prevent inflationary price and interest rate increases. Furthermore, a decline in the dollar strength alone will not repair the American trade imbalance.**

Foreign policy discussions have often negatively altered American (and California) trade performance. The agricultural section of this report discusses more fully trade embargoes that caused permanent loss of foreign customers for California commodities. As noted in the previous section, negotiations over COCOM rules for the sale of high technology products to communist nations become complicated by conflicting interests of the COCOM members in balancing military, economic, and diplomatic interests. The rate of applications for sales approval delayed millions of dollars of business for California firms.

Competition faced by American producers includes that generated by off-shore factories and farms established by American owners. Relocation of manufacturers to sites abroad sometimes is facilitated by development resulting from U.S. economic aid programs. For instance, 26% of the U.S. canned tuna imports came from the Filipino tuna industry established with financing from the U.S. Agency for International Development.

Additionally, tuna processors in U.S. territories (American Samoa and Puerto Rico) are sited on locations developed with federal funds, use workers trained with U.S. financial assistance, and receive tax advantages under the U.S. Federal Government Program 936, which exempts from federal taxes operations based in U.S. territories.[19]

Federal trade programs are promoted by the United States Department of Commerce with district offices in Los Angeles and San Francisco. The Department's U.S. and Foreign Commercial Service (US&FSC) personnel are in overseas embassies and

consulates in 68 countries. The US&FSC domestic offices include four California offices, Los Angeles, San Diego, San Jose and San Francisco. Services provided include export counseling, identification of agents and product distributors, export contacts, and information on trade opportunities, foreign companies, licensing requirements and trade statistics.

The overseas offices also assist in trade shows and exhibits as well as arranging meetings between American business visitors and foreign contacts. As the US&FSC personnel serve the entire U.S., an inherent conflict affecting a state's interests arises when two or more states are sources of potential exports.

The Small Business Administration provides trade counseling from retired business export executives who volunteer their expertise through a program known as SCORE (Service Corps of Retired Executives). It also operates a Guaranty Loan Program backing commercial bank loans for export-related activities by qualifying small businesses.

Other financing for trade activities is from the Export-Import Bank of the United States, known as Exim Bank. Direct loans are made to foreign buyers for purchase of U.S. equipment for major projects, and guarantees and insurance assistance are provided to American exporters for international transactions. The import activities of small and medium-sized buyers of American goods are facilitated through a cooperative financing program involving banks in the buyer's home country.

Complaints from California and other states charge that Exim Bank procedures are complicated, lengthy, and discouraging to the new and inexperienced exporter. Other difficulties stem from the lack of promotion of the Exim Bank, which means many businesses are unaware of its services. The Exim Bank has been ordered by Congress to devote more attention to small and medium-sized business rather than the large firms to which it has been geared.[20]

STATE TRADE INITIATIVES

In growing recognition of trade importance and spurred on by the federal government, state governments have stepped up their trade activities significantly since the beginning of the decade. From 1982-1984 under the Reagan administration as part of its new federalism, federal officials in a program called SAFE (State Agenda for Exports) visited state officials and agencies to encourage and facilitate local initiatives to promote trade. William Brock, while serving as the United States Trade Representative, told the National Conference of State Legislature's trade task force to "...move as aggressively as you can..." on export opportunity internationally.[21]

In 1984, 46 states spent an estimated $27.7 million on international trade programs. Most programs are geared toward small and medium-sized businesses and potential exporters though assistance and information is available to firms of all sizes.[22] State trade missions, trade shows, and fairs total more than 300 for 34 states, including California, during the 1980-85 period. In addition to the exhibitions and missions, among the most common trade promotion efforts are overseas trade investment offices and public/private trade advisory councils. Export financing assistance targeting small and medium-sized firms have been established by 14 states.

Export trading companies, a concept that has been developed to its full potential by the Japanese and some European nations, are being considered. North Dakota, which owns a state bank, flour mill and grain elevator, has developed a publicly-backed, privately-funded export trading company for the State's agricultural products. In an example of interstate cooperative activity which characterizes other promotional programs, the Ports of New York and New Jersey are authorized to jointly develop an export trading company. Similar legislation for creation of export trading companies by public entities has been enacted by Mississippi, New Jersey, Oregon, and Virginia.

The creation of export trading companies encouraged under the Export Trading Company Act of 1982 has not been without problems. Major banks and multinational firms which attempted to enter the field have been disillusioned by the need for expertise in the complexities of operating an export trading company--negotiating with regulatory agencies, procuring export licenses, managing warehouses, providing accounting services, and other technical and logistical assistance. Sears World Trade Incorporated reportedly lost $37 million on sales of $269 million during its first two years of operation.[23] Where the trade infrastructure is strong (as in California) and there are experienced and knowledgeable freight forwarding companies, export management firms, financial and insurance institutions, the need for public export trading companies is minimal.

The Minnesota Legislature adopted a plan for a $100 million privately funded world trade center which would house state operated trade promotion programs and serve the entire region. Illinois also has a world trade center under consideration.

Other states have developed university based programs to assist small business and strengthen their academic curriculum on international trade. In Washington, trade centers were created for forest products at the University of Washington, and for agricultural products at Washington State University.[24]

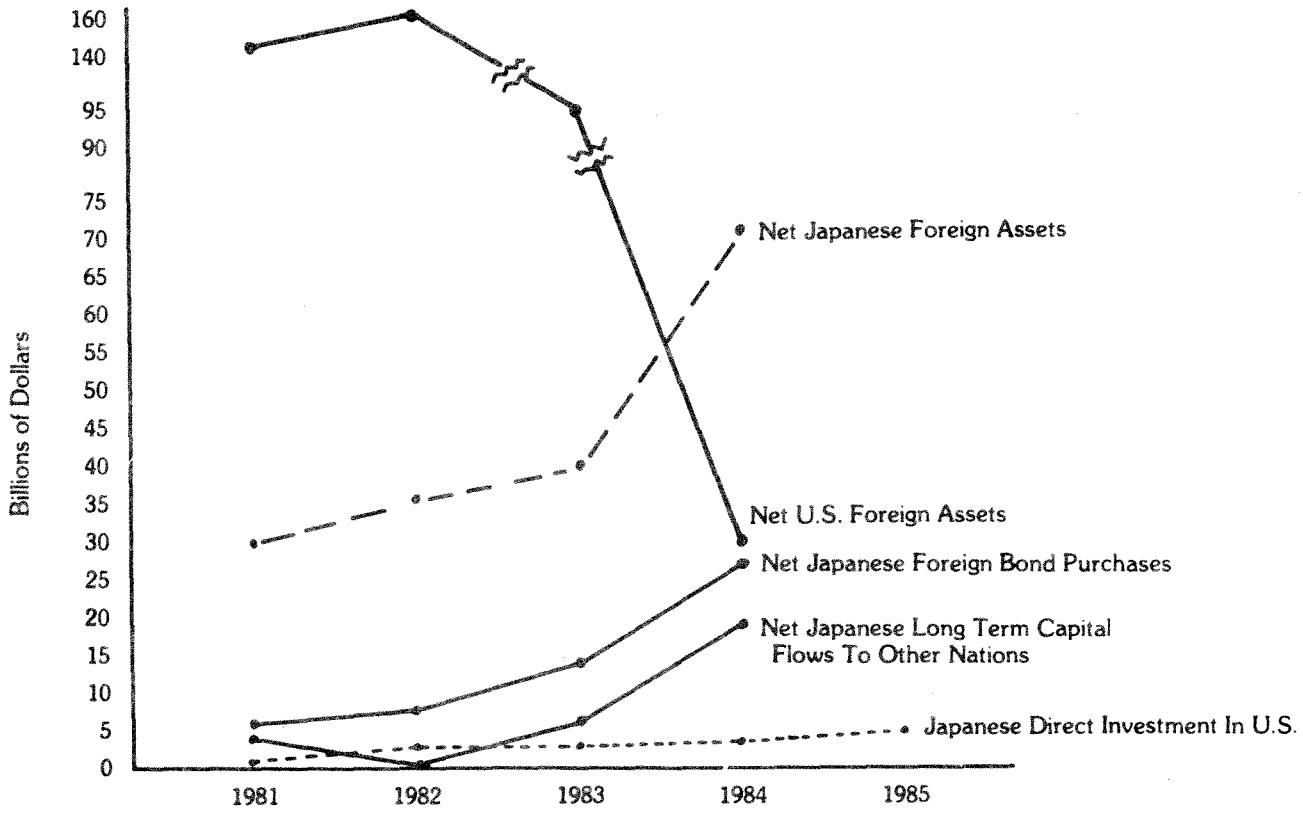
A number of states for years have focused on attracting foreign investment to develop local businesses and industry. Major efforts with both state-based departments and overseas offices have been launched for European as well as Asian capital. By 1981, the value of foreign-owned property, plants and equipment in the U.S. reached $180 billion and accounted directly for 2,343,115 jobs.

While the prospect of employment and increased economic activity from new or expanded industries due to foreign investment is enticing, some caution is needed before committing to unhesitant

recruitment of foreign funds. Not enough is known or understood about the total volume and impact of inflows of capital from abroad into American industries and ventures. The increase in foreign investment over the past few years has been dramatic.

Data from the Bank of Japan show that through the end of 1984, long-term capital outflows from Japan was approaching $18 billion; its net foreign bond purchases jumped from less than $5 billion in 1980 to over $27 billion in 1984.[25] From less than $15 billion in 1980, Japan's net foreign asset portfolio grew to a total of $80 billion by 1985. In contrast, during that same period, U.S. foreign assets fell from more than $100 billion to under $40 billion, after peaking at more than $150 billion in 1982.[26] In 1985, more than $3 billion of companies and properties in the United States, 91% of it in trade, manufacturing and finance, was owned by Japanese interests.

Figure 8



Supplied by Regis McKenna, Inc.

Sources: Business Week - April 8, 1985
Wall Street Journal - Aug. 16, 1985
Wall Street Journal - Aug. 29, 1985

The number of "most beneficial" and "useful" investments in the U.S. from the United Kingdom surpasses even that of the Japanese; Canada and Germany are not far behind Japan.[27] In 1981, California alone had investments worth $19.6 billion and 240,774 jobs owed to invested funds from overseas.[28] Later figures developed by Mentor International show a 1982 total of 251,700 California jobs due to foreign direct investment, with 27,100 coming from Canadian investments, 144,800 from European investments, and 42,900 from Japan.[29]

Due to international economic developments and the changing financial relationships between major industrial nations, thoughtful analysis must be given to inward investment for its long-term implications for the California and national economy. Questions about how shifts in financial relationships may affect our international influence remain to be examined. More information is needed not only on the source of the investments but also specific data on companies and industries, locations, employment, and any investment trends to determine what initiatives, if any, are needed.

CALIFORNIA PROGRAMS AND LEGISLATION

Established in 1983 by statute, the World Trade Commission (WTC) is a fifteen member body with broad authority for activities which promote California trade interests. Under its statutory charge to serve as California's official representative to foreign governments, the Commission is authorized to perform research and establish programs pertaining to international trade, foreign investment, international tourism, and overseas offices. It also may propose legislation, research incentives and disincentives for world trade opportunities in California, and coordinate with both public and private agencies on marketing and other trade promotion activities.

The Secretary of State by law chairs the Commission, which statutorily includes the Governor and Lieutenant Governor. Seven additional Commission members are named by the Governor, the President Pro Tem of the Senate and the Speaker of the Assembly. The remaining five members are appointed by the World Trade Commission (WTC) advisory council, a body of 20-40 people which include as members the directors of the Departments of Commerce and Food and Agriculture, the Superintendent of Banks, and two members of each house of the Legislature. The remaining council members are appointed by the Commission.

Since its inception, the WTC has interpreted its powers to include working with the California Congressional delegation and communicating with key federal officials on export and trade issues which affect California interests. In response to Assembly Concurrent Resolution 48 (1983), which charged the Commission to give high priority to farm exports, the WTC has been particularly active with the agricultural trade sector, spending considerable time and effort in developing information on trade-related issues and lobbying in Washington on federal farm and other trade-related actions.

The Commission has also organized participation in trade fairs, missions and exhibitions overseas, and has conducted agricultural trade seminars. The Commission has been the Californian host, on occasion, to visiting foreign dignitaries and trade officials.

Legislation by Senator Rose Ann Vuich established a $2 million Export Finance Program to assist small and medium-sized businesses to increase and develop their export sales. Administered by the Export Finance Office under the WTC, the program helps secure and guarantees loans up to $350,000 per export transaction. The program complements federal financing programs by covering risks not normally eligible from other sources and extends the loan capability of the applicant beyond other available programs. While the program is working well, its

impact and success is limited by the sizes of both its staff and its guarantee fund. Additionally, service to the agricultural sector has been limited by the level of understanding of the farm export system and its needs.

Foreign trade barriers along with California laws and regulations which hamper agricultural exports will be further examined by the WTC as required by the Statutes of 1985 (AB 668, Bronzan).

Assembly Bill 1423 by Assemblymember Norman Waters establishes the Foreign Market Development Export Incentive Program for California Agriculture, a cooperative marketing program which promotes farm commodities not covered by the federal market promotion. Grants from the $2.1 million fund must be matched by industry.

Other activities being undertaken by the WTC are the creation of a computerized trade leads program and a California export directory. In 1985, the Commission contracted for a study of the feasibility of establishing overseas offices. Results of the study by Mentor Associates have raised a good deal of discussion in the trade community, primarily for its selection of London as the initial overseas office location and for its emphasis on the attraction of inward investment. Current legislation and the Governor's proposal for overseas offices will bring this subject to the attention of the Legislature in 1986.

Assembly bills (AB 1300 and AB 1591) addressing reform of California's unitary tax create a California Office of Trade Policy and California Office of Export Promotion. The two offices would operate programs funded from revenues collected under the water's edge option established as an alternative to present California unitary method of taxation.

Even though it was born when it was most needed, the World Trade Commission has been viewed with some skepticism from the sector

it serves and the ones involved in its creation. No other California agency has its unique status in state government. The WTC is an independent, nonprofit, public benefit corporation within the Governor's office, on which sits the Governor, but over which he has no direct authority. As an independent commission it has broad powers but little staff, implements few programs, lacks a body of law to administer and determines on its own initiative state policy with little accountability to the public.

Partly as a result of its administrative structure and the circumstances surrounding the establishment of the WTC, California has lacked a coordinated approach to activities for enhancing trade performance, despite the interest of the Legislature, the Administration, and the various sectors involved in exportation of California products. Except for the systematic attention paid to agricultural trade issues, most of the activity involving other industries and exports has been relatively haphazard and hampered by an inadequate governmental support system and shortage of personnel.

THE UGLY AMERICAN, 30 YEARS LATER

The title of a popular novel by the late political scientist Eugene Burdick published in the mid-50s gave birth to the catch phrase used to connote a propensity for Americans visiting or working overseas to expect without question American standards of behavior, lifestyle, and culture throughout the world. Though the level of sophistication has increased since then and American tourists and visitors abroad, no longer quite so ugly, have developed an understanding and appreciation of foreign cultures, **the degree of internationalism needed for successful business operations is still limited.**

Prime Minister Yasuhiro Nakasone observed that the entry of American companies into Japan is limited by their failure to learn Japanese and to provide product literature and/or documents in the native language.[30] The late Mark Zimmerman, former president of the American Chamber of Commerce in Japan, in a recently published book, tells of failed business contacts between Americans, whose business decisions are frequently based on opportunity and a competitive philosophy, and Japanese, who in contrast, build their business relationships slowly on trust.[31]

Other books, daily news media and business publications tell similar stories of dashed opportunities, due to cultural misunderstanding or bias, with prospects in the People's Republic of China, other Pacific Rim nations, Third World countries and some members of the EEC. **Besides not knowing the language, history, and social or business culture of the new markets, Americans frequently fail to even appreciate the importance of sensitivity to the differences.**

California Business notes that Pacific Basin observers contend that California businesses are deficient in their marketing research and advertising in Asia. At a Pacific Rim Conference in December 1985, sponsored by the Center for a New Democracy, participants in a session on strengthening the international trading system discussed the need for U.S. businesses to do more sophisticated and intensified homework for marketing their goods abroad.[32] While it is true that many of these markets are closed to American goods, a better understanding and appreciation of the culture and market intelligence can lead to more success in penetrating and opening up the markets.

Preparation of the State's population to be an active part of the global economy also needs strengthening. Public school students know little about the economy, political system, or culture, of other nations. Students throughout the non-English speaking

industrialized world learn English, many becoming both fluent and literate in the language. In contrast, foreign language offerings below the high school level in California are virtually nonexistent. Moreover, there is little incentive or encouragement for high school students to take more than the minimum required.

The situation in the State's universities and colleges is equally disappointing. In an era of the Pacific Asian countries' growing influence and importance in the world, in 1984 only 113 students (57 undergraduates and 56 graduates) were majoring in Asian studies in the entire University of California (UC) system. The data provided by the University also show only 131 majors in Asian languages, including linguistics. No accurate count exists of students taking these courses or Asia-related classes offered in the social sciences, political science, history, economics, sociology or the humanities.

Figure 9

WHO'S LEARNING ABOUT WHOM?

1984

CALIF. STUDENTS STUDY ASIAN CULTURES	ASIAN STUDENTS IN CALIF.
UC system: 57 undergraduates in Asian studies 56 graduates in Asian studies 131 majors in Asian languages 39 students in Education Abroad Program in four Asian cities Total - 283	2901 non-resident students from Asian countries
CSU system: 499 FTE* in Asian Culture and Languages	4600 non-resident students from Asian countries

*one FTE = 6-10 students

Source: UC Legislative Office; CSU Chancellor's Office

During the same year, 2,901 students from Asian countries were registered in the UC system versus 39 studying in the UC Education Abroad Program in Beijing, Hong Kong, Taiwan, and Tokyo.[33] (Yet, Japan's Prime Minister Nakasone in last year's election campaign introduced an educational reform program which proposed among its seven points "...the internationalization of universities through the promotion of language study, encouragement of international understanding, and increasing the number of foreign students in Japan...")[34]

In the California State University (CSU) system, more than 4600 students were on visas from the Pacific Rim; an additional 1700 students are permanent residents from Pacific Rim nations. Fewer than 499 FTEs (full time equivalent, which represents 6-10 students) were enrolled in Chinese or Japanese language courses. Until recently, a student enrolled as a business administration major, by doing a case study of a multinational or foreign firm, could receive a degree in international business without ever taking any foreign language courses. The addition of a foreign language requirement is currently under consideration by the system, as is the possibility of centers on one or several campuses for Pacific Rim studies.[35]

Writing in the New York Times, Leonard Lauder, the president of Estee Lauder Inc., whose family founded the Joseph Lauder Institute of Management and International Studies at the University of Pennsylvania, cites a National Council of Foreign Language and International Studies investigation covering 1690 men and women working toward doctoral degrees in business during Spring 1984. Only 17% were taking any courses in international affairs or foreign languages, a drop from 25% in 1976! Lauder further notes that only 13 of the 563 business schools that will graduate 50,000 MBA candidates in 1986 require foreign affairs or language courses for graduation. Also, foreign language ability is not necessary for entry into the foreign service with the State Department.[36]

In July 1985, the UCLA Center for Pacific Rim Studies was established to focus on this area in a multi-disciplinary issue-oriented manner. Curriculum development, sponsorship and publication of research, and external programs for short-term and part-time training for mid-career professionals such as journalists, business people, attorneys and government officials are part of the Center agenda.

Future developments in the UC system include a proposal for a $1 million University-wide research program on the Pacific Rim region. This program will cut across many academic disciplines and would include studies in trade, finance, comparative economic development, cross-cultural communication and changing technology and competition.[37]

A promising venture is the graduate School of International Relations and Pacific Studies being planned for the University of California, San Diego, which will be the first in the UC system. The only other professional school of international relations in California, one of three west of the Appalachians, is at the University of Southern California. Interdisciplinary studies and joint degree programs will be offered in coordination with other UC campuses and professional schools. Students can enroll for advanced career training or in masters or doctoral programs.[38]

DOMESTIC SUBSTITUTION: A Complementary Strategy

California uses many products, supplies and services from out-of-state industries. In many cases, no inherent reasons exist for the lack of California suppliers for these products. Other states and their industries, viewing California as a lucrative market, aggressively sell their products to our manufacturers and businesses.

A forward looking economic development policy for the state must look to advancing the competitiveness of California business and industries in the national and global marketplace. An overall economic development policy should also include a strategy of assisting California businesses and entrepreneurs in serving the State's own consumer, service, and manufacturing interests. Domestic substitution is such a strategy; it requires identification of products and services of out-of-state origin and complementary information on potential in-state suppliers. The lack of usable intelligence concerning these market niches is often a major barrier to the development of local industries which can meet some of our own needs.

Other states and localities have identified services which can be supplied locally. Regional efforts have been undertaken in some areas of the State (Southern California, Placer County, City of Stockton) to develop and publicize this kind of information as an economic development service to existing businesses and new entrepreneurs. **As a strategy which promotes opportunities without erecting barriers to sales from present out-of-state or foreign suppliers, domestic substitution can increase California economic activity and complement public and private efforts to expand sales domestically and internationally into new markets and new market niches.**

Pork production is an example of a state industry with potential for domestic substitution. According to the California Pork Producers' Association, 97% of the State's consumption of fresh pork and pork products is imported from other American states. One of the State's two processors of pork products buys no California hogs, and the other can obtain from within the State less than one-fifth of its production needs.[39] The generally cited problem of high feed costs is being met with current research and innovative uses of agricultural byproducts. Hog-raising expertise, which is in short California supply can be recruited from the Midwest where hog production is strong or

developed from among our livestock interests. Based upon these factors, development of a credible economic analysis could generate interest among potential producers and financiers.[40]

CONCLUSION

Many of these recommendations which emanate from this report are already being proposed, others are under consideration and the rest are new to discussion in the California Legislature. There are philosophical, procedural, and administrative difficulties which may confront a number of the recommendations. **Yet, because of the import penetration of foreign competitors into the California and American markets and the shrinking of the manufacturing and technology sectors of the economy in the face of inaction, it is important to look to the future with a policy which enhances expansion of trade activities.**

Other states have begun a series of initiatives and will cut into the traditional competitive advantage which California has enjoyed. An additional threat to the sustainability of the California trade economy is the increasing competitiveness of other nations through their own industrial development and government-supported export policies.

We must further look on trade not in isolation from other sectors of California's economy, but as an important component of the overall performance of the agricultural and manufacturing sector in an increasingly interdependent international economy. The fit of policies, programs and activities toward the goal of improving the State's economic competitiveness must be inclusive of a wide range of issues and actions.

California is at the hub of the Pacific Rim, which includes the bordering countries in Canada and in Latin America as well as the Asian nations overseas. The State's position at the hub must be

strengthened; particular emphasis should be paid to economic relations with the Asian Pacific economies, whose lesser members outside Japan are showing strong industrial growth and will join that nation as major players on the international scene.

FOOTNOTES

1. California State World Trade Commission, "California: Gateway to the Future," 1984.

2. United States Department of Commerce International Trade Administration, "1981 U.S. Manufactured Exports and Export Related Employment: Profiles of the 50 States and 10 Selected SMSAs," July 1984.

3. U.S. Department of Commerce, ibid.

4. California Department of Food and Agriculture, Annual Bulletin , California Crop and Livestock Reporting Service, "Exports of Agricultural Commodities 1984."

5. California State World Trade Commission memorandum; Security Pacific National Bank, U.S. International Trade, September 1984; Security Pacific National Bank, California's International Trade, October 1982.

6. Security Pacific National Bank, U.S. International Trade, September 1984.

7. California State World Trade Commission.

8. Dan Pilcher, "State Roles in Foreign Trade," State Legislatures, April 1985.

9. John Boal, "The Pacific Rim Adviser," PSA, June 1985.

10. California State World Trade Commission; Security Pacific National Bank International Trade Databank; Canadian Consulate General, "1984 Canada/California Trade," July 1985.

11. United States Department of Commerce, Business America, March 4, 1985; Canadian Consulate, op. cit.

12. Discussion in this entire section draws from information contained in California State World Trade Commission memorandum; Security Pacific National Bank, U.S. International Trade, June 1983 and United States International Trade, September 1984.

13. Saburo Okita paper, "Pacific Dynamism," presented at conference, Transition in the Pacific Rim, sponsored by the Center for a New Democracy, Laguna Niguel, CA, December 1985.

14. Canadian Consulate General, op. cit.

15. Murray L. Weidenbaum, with Michael C. Munger and Ronald J. Penoyer, "Toward a More Open Trade Policy," Center for the Study of American Business, Formal Publication Number 53, January 1983.

16. Financial Time, January 10, 1985; October 7, 1985; October 8, 1985; October 17, 1985.

17. California State World Trade Commission, Report to the Legislature, Agricultural Trade Activities, August 30, 1985; Agricultural Council of California, A Perspective on the Importance of International Trade to California, September 1985.

18. California State World Trade Commission, ibid.; Agricultural Council, ibid.

19. Dennis M. King, Ph.D., and Harry A. Bateman, "The Economic Impact of Recent Changes in the Tuna Industry," California Sea Grant College Working Paper No. P-T-47, August 1985.

20. Information in this section comes from the U.S. Department of Commerce, International Trade Administration; and the New York Senate Committee on Commerce and Economic Development, Senator Walter J. Floss, Jr. Chairman, Export Trade Financing, 1983.

21. Pilcher, op. cit.

22. United States Small Business Administration, State Export Promotion Activities, October 1984, and National Associations of State Development Agencies, "State Export Program Data Base: Budget and Staff," 1985.

23. "The No. 1 Yankee Trader gets the Ship Back on Course," Business Week, March 25, 1985.

24. Pilcher, op. cit., and New York Senate Committee, op. cit.

25. Information is from charts prepared by Regis McKenna, Inc., from the following sources: Bank of Japan, printed in Business Week April 8, 1985; Japanese Finance Ministry and U.S. Department of Commerce, printed in the Wall Street Journal, August 16, 1985.

26. Regis McKenna, Inc. charts, Wall Street Journal, op. cit. and Wall Street Journal August 29, 1985.

27. "Sources of 'Preferred' Foreign Investment Into USA, 1981 Through 1983," Chart by Mentor International.

28. Carol Steinbach and Neal R. Peirce, "Cities are Setting Their Sights on International Trade and Investment," National Journal, April 28, 1984.

29. "Employment in U.S. Affiliates of Foreign Corporations, 1982," Chart by Mentor International.

30. "Text of Prime Minister's Nationally Televised Press Conference," excerpted in Japan Report, May/June 1985, Japan Information Center, Consulate General of Japan, New York.

31. Mark Zimmerman, How to Do Business With the Japanese: A Strategy for Success, Random House 1985. International Trading System,".

32. Conference: Transition in the Pacific Rim, "Initial Summary, Session II: Strengthening the International Trading System."

33. Data provided by legislative office, University of California.

34. "Ad Hoc Council on Education Developing Wide Ranging School Reform," Japan Report, January/February 1985, Japan Information Center, Consulate General of Japan, New York.

35. Conversations in October and December and correspondence with Dr. Kibbey Horn, Director of International Programs, Office of the Chancellor, California State University, Long Beach.

36. Leonard A. Lauder, "The Language of Foreign Trade," New York Times, October 7, 1985.

37. Pacific Rim Studies brochure, UCLA, 1985.

38. "Summary: Proposal for a Graduate School of International Relations and Pacific Studies at the University of California, San Diego," Office of the Chancellor, UCSD.

39. Conversations in January, 1986 with Mark Parreira, Executive Secretary, California Pork Producers Association.

40. John Siebert, Extension Economist, U.C. Davis, and James Farley, Farm Advisor, University of California Cooperative Extension, Merced County, unpublished paper, "Factors Influencing the Supply and Demand for Pork in California," 1985.

MAJOR POLICY

Exportation of California's goods, commodities and services shall be a primary goal of the state's trade policy. The State shall promote trade with a mix of programs and actions that develop export potential, expand funding opportunities, influence federal policies affecting California trade, and facilitate international commercial exchange. Particular attention will be focused on nations of the Pacific Rim, especially the rapidly developing Asian economies.

POLICY: Pursue a focused trade policy for California with an emphasis on promotion of export of California products and the international competitiveness of California industries.

Implementation Recommendation #1: Establish within the Business, Transportation and Housing Agency a strong administrative structure which will ensure the coordination of state programs related to the competitiveness of our industries, monitor domestic and overseas developments on trade issues in cooperation with the World Trade Commission, the Department of Food and Agriculture and other state agencies with trade responsibilities. The Agency should also establish an active California presence in Washington to work with the Administration and Congress in furtherance of the interests of California's industrial competitiveness and expansion of our export opportunities.

Implementation Recommendation #2: Expand California's current export finance program with additional funds, adding provisions for conditional removal of the loan guarantee cap, and develop new programs with matching fund requirements for larger contracts and exporters. Program targets should continue to be small, medium-sized and newly-exporting firms.

POLICY: Develop a powerful state infrastructure to assist firms which are able to export to find opportunities to do so. Promote the concept of "domestic substitution" by which in-state demands for services and supplies are met by in-state suppliers.

Implementation Recommendation #1: Establish a Division of World Trade within the Department of Commerce. This Division would work with local Chambers of Commerce, Economic Development Associations and other organizations to identify small and medium-sized firms with export potential. The Division would also operate a program to monitor foreign investment in California and organize a data bank and information program, coordinating with the World Trade Commission, to provide leads on trade opportunities to the private sector.

Implementation Recommendation #2: The Division would promote the pursuit of "domestic substitution" as a competitive strategy, by developing data and analyses which identify needed products of out-of-state origin and potential in-state suppliers. The Division will thus serve as a clearinghouse of such needs, thereby providing new markets for California's new or maturing industries.

Implementation Recommendation #3: Support investment by pension funds, government bonds or venture capital in new California enterprises which replace state imports with local products.

POLICY: Enhance the development of California's export potential with overseas technical and logistical assistance.

Implementation Recommendations #1: Establish California Overseas Trade Offices under the aegis of the Governor's Office. An abiding and long-term commitment, evinced with substantial

funding for sufficient and experienced staff familiar with foreign languages, business community, culture, and governments of both California and its market(s), is necessary. The overseas office will counsel California firms in their dealings abroad and assist in making contacts, accessing supplier and distributor networks, translating documents, arranging facilities, developing the necessary foreign infrastructure, enhancing cultural understanding, and monitoring market and governmental developments to provide commercial intelligence to businesses and the domestic trade office.

Implementation Recommendation #2: Given California's volume of trade with and economic development of the Asian Pacific region, the first of the overseas offices should be located in Tokyo, Japan. With credible domestic data and overseas market intelligence, additional offices should be opened in a second Pacific Rim location (outside Japan), Europe, Canada and Latin America.

POLICY: Increase the emphasis on global affairs in our educational system to prepare California citizens for living and working in a global economy.

Implementation Recommendation #1: Expand support and funding of AB 2543 (Farr, Statutes of 1985) to provide articulated global studies curriculum as developed by Stanford University throughout the K-12 public school system.

Implementation Recommendation #2: Further integrate language, culture, and international affairs courses into business and management curricula in the State's higher education institutions.

Implementation Recommendation #3: Establish international business fellowships for overseas placement, funded and

coordinated in partnership between the public and private sectors and expand current study abroad programs.

Implementation Recommendation #4: Develop centers for translation of foreign business and scientific documents on some of the University's campuses to provide students with pertinent work and to provide the public and private sector with information on technological developments. As an adjunct to these centers, establish a fee-based program for translations of scientific, technical, regulatory, and legal papers for the business and professional community.

CHAPTER 5

Human Resources

THE SITUATION

California, the seventh largest economy in the world, still relies on the risk taking tradition that leads to its success.

California's early settlers spurred the State's economic growth by building missions, mining for gold, developing the farms and building the railroads, roads, water projects, and cities.

Today's pioneers in the aerospace and microelectronic industries prosper in the State's entrepreneurial climate, supported by superb universities which educate a skilled and creative workforce. The State's investments in public works and education were successful in providing the framework for the development of the high tech revolution.

However, while California industries still lead in innovation and new product development, a recent SRI report found that they are falling behind in applying technology to manufacturing. With the recent downturn in the microelectronic industry, the current projections for economic growth may be optimistic.

For California to effectively compete in a global economy while maintaining or expanding the real income for its residents, it must encourage applying advance technologies into its manufacturing sector and expanding the markets for its products. In order to achieve these objectives, California must again invest in its people and its public works.

In the words of Robert Reich:

> "Our economic future must be rooted in the only resource that will remain uniquely American: Americans

themselves. The industries that will sustain the next stage of America's economic revolution will necessarily be based on a skilled, flexible, less hierarchical organization of work."[1]

With technological changes and the decreasing cost of telecommunications, California must maintain a skilled literate workforce or face losing much of its employment in service industries to other states or nations. Currently, employers in the United States spend at least $40 billion annually on training their employees. They are increasingly willing to move to other states to save training dollars required for basic education of entry level employees.

Business leaders have made it clear that they want high school graduates with a command of English; the capacity to reason and solve problems; the ability to read, write, and compute; an understanding of science and technology; the ability to interact with others, and positive work habits and attitudes.

THE NEED

California still boasts a well-educated and skilled workforce when compared with the rest of the nation. However, recent demographic projections indicate that California must make substantial investments to upgrade its adult education and K-12 systems in order to remain competitive with other states:

- 90% of the workforce in 1990 and 75% for the year 2000 are already out of school and in the workforce. Yet, the Department of Education found that 25% of California's adults were functionally illiterate.

- California will be a minority state by the year 2010.

- 36% of California's workforce will be Hispanic or Black by the year 2000.

- Over 50% of California's school population will be minority by the year 2000. While 82% of the national adult workforce has a high school diploma, 45% of the Hispanic and 29% of the Black adult workforce do not.

Given the demographic projections and the clear failure of our current educational institutions to effectively educate Hispanics, immigrants and their children, Blacks, and under-achieving Non-Hispanic Whites, major changes must be adopted now in adult education, K-12 and the community colleges if the State is to maintain the overall quality of its workforce.

Maintaining California's preeminent university systems are a key component in any human resource strategy. The universities have been the hub of the high tech revolution and will remain critical in supplying industry with trained personnel to maintain California's lead in innovation by introducing new technologies and management techniques into established industries.

California also needs to seize its geographic advantage and educate its workforce in the languages and cultures of the Pacific Rim in order to become the hub of trade activities. Our current educational failures in this arena are unfortunate since the majority of America's Pacific Asian groups, except for Japanese Americans, are foreign-born.

If policymakers focus on California's changing demographics and meet the immense challenges of educating and re-educating our workforce, then we will continue to reap the benefits of a strong economy. And the next economic revolution will occur in California.

POPULATION

California's population will approach 32 million in the year 2000. [2] That seven million increase represents enough people to turn Sacramento into a city the size of Los Angeles.

Since the turn of the century, California has been one of the fastest growing states in the Union. California exceeded the national rate by 14% in the 1960's, and by a narrower 7% in the 1970's. Demographers continue to project a more rapid growth for the State's population than for that of the nation.[3]

Public policymakers are already wrestling with the current problems of aging infrastructure, gridlock on major metropolitan freeways, lack of affordable housing, air pollution, raw sewage in bays and rivers and contaminated water supplies. If state and local governments are not able to address these current problems, the quality of life in California will deteriorate with the projected increase in population.

It may be because of these problems, particularly the lack of affordable housing, and the high State unemployment rate in the late 1970's that the migration from other states to California decreased. The net in migration from other states has increased in the early 1980's with the better educated still apt to move here, but with lower paid workers apt to leave.

Where Growth will Occur

The Los Angeles/Long Beach-Anaheim Standard Consolidated Areas (SCA) is projected to grow by 3.5 million persons from the year 1980 to the year 2000. [4] However, since this is not the fastest growing area in the State, its percentage of the State's population will decline slightly. The greatest percentage growth is projected to be in the outlying counties of Riverside and San Bernardino.

The City of Los Angeles, itself, is projected to grow slowly. In recent years its population increased by 150,000 only because of immigration from Latin America and Asia. Otherwise, it would have lost about 250,000 persons between 1970 and 1980.[5]

The San Francisco/Oakland/San Jose SCA will grow from 5.17 million in 1980 to 6.31 million in the year 2000. Its percentage of the State population will also decline slightly.[6]

Combined, Los Angeles and the Bay Area will have approximately two-thirds of the State's population.

In contrast, the San Diego and Sacramento regions are projected for rapid growth.[7] Sacramento and San Joaquin counties are considered attractive areas for building manufacturing facilities because of the availability of relatively cheap land and housing.

The mountain counties are projected to be the fastest growing counties.[8] However, because of their small population base, this growth will not drastically alter their share of the State's population.

TABLE I

Fastest Growing Counties in Year 2000[9]

Counties	Annual Percentage Growth
Calaveras	6.2
Nevada	5.9
Lake	5.9
Placer	4.6
Sierra	4.0
Mariposa	3.8
Riverside	3.5
Tuolumne	3.4

TABLE II

The Ten Largest Counties in California in the Year 2000[10]

County	Population (in thousands)	Percent of State's Population
Los Angeles	8,474.2	27.0%
San Diego	2,849.0	9.1
Orange	2,605.4	8.3
San Bernardino	1,157.8	5.1
Santa Clara	1,592.5	5.1
Alameda	1,276.3	3.8
Riverside	1,200.1	3.8
Sacramento	1,186.6	3.8
Ventura	838.0	2.7
Contra Costa	836.0	2.7
Rest of State	8,958.1	28.5
California	31,414.0	100.0

Majority of Minorities in the State by the Year 2010

California is a state in which current minorities will be the majorities by the year 2010.[11]

It is projected that Non-Hispanic Whites will constitute 52.4% of the population, Hispanics 28.5%, Asian and Others 11.7%, and Blacks 7.4% by the year 2000. By the year 2010 the Non-Hispanic White population will become a minority group when its percentage of the population drops to 47%.[12]

The growth in the Hispanic population will double from 4.5 million in 1980 to a projected 9 million in the year 2000. Asians represent the fastest growing group with an increase during the same period from 5.6% to 10.6% of the total population.[13]

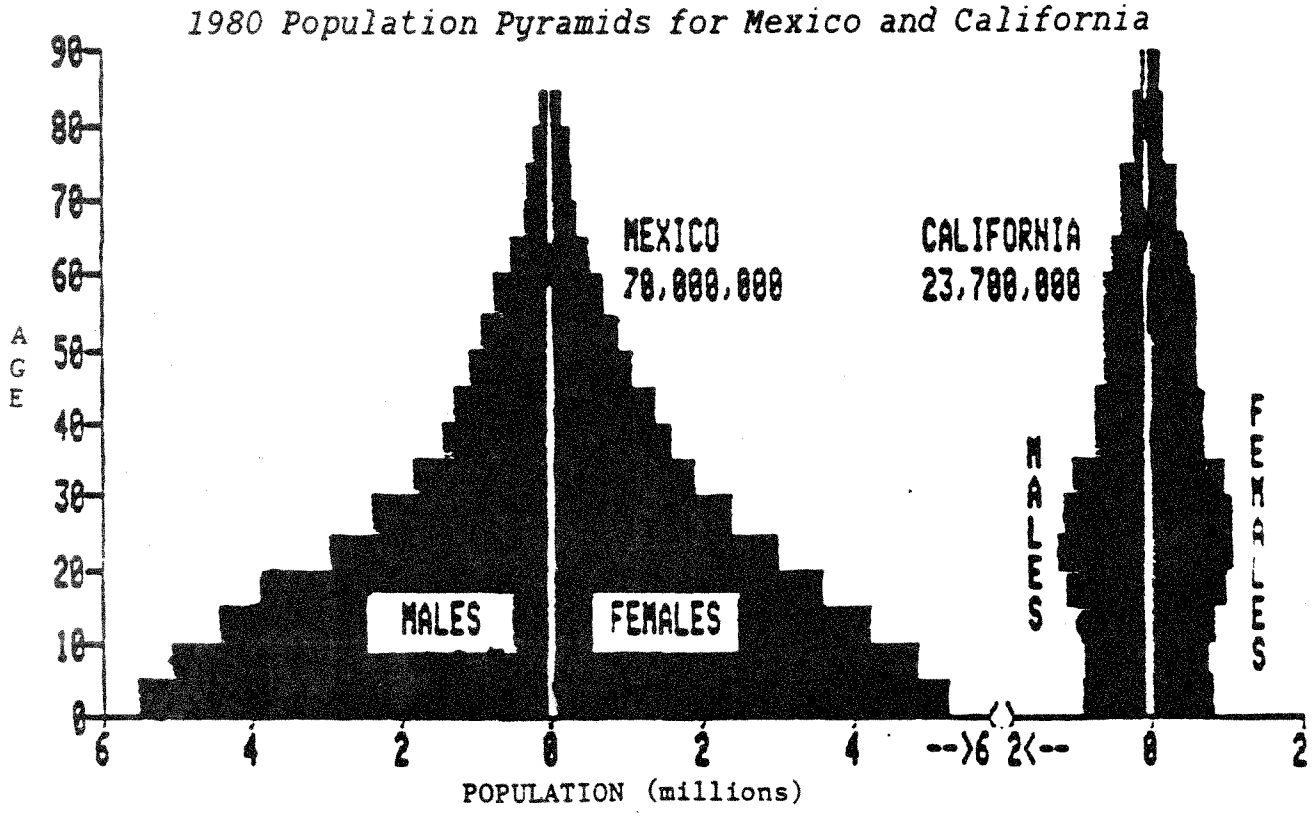
These demographic projections are based upon fairly conservative assumptions about immigration. In addition, a very low rate of net migration from other states is projected. The migration from other states is largely affected by employment opportunities and quality of life issues.

Immigration from other nations is largely influenced by federal decisions, such as the adoption or rejection of a federal immigration bill, expansion of the refugee program or by the political or economic realities in other countries such as the Philippines, Mexico, and other Latin American countries. Immigration to California and the U.S. may be more influenced by the "push" factors in those countries than by the "pull" factors of jobs and quality of life in California.

The demographic projections for Mexico are illustrative. Mexico's population is projected to grow from 80 million to 128 million people in 2010.[14] The chart on age structure demonstrates the growing working-age population as Mexico approaches the turn of the century. This growth will occur even though almost half its labor force of 23.9 million is unemployed or underemployed.

To accommodate the workforce increase over the next 15 years, Mexico will have to increase its jobs by over one million per year just to maintain its current high level of unemployment and underemployment.[15] This, coupled with an average $3.17 per day in U.S. dollars for an agricultural worker makes even our minimum wage seem attractive.[16] See the following chart.

Figure 1



Sources: Scientific American, September 1980 and the 1980 Census

A recent report describes a model of Mexican immigration which takes into account the divergent finding of prior studies based upon different data.

The model postulates stages of Mexican immigration beginning with short term immigrants, largely single young men, who return to reside at the border region of Mexico as soon as they earn sufficient income. Cyclical immigrants secure more permanent or seasonal employment and return regularly to their homes and family in Mexico. The third group is permanent immigrants who bring their families to live with them.[17]

California already has the largest percentage of foreign-born residents in the nation, with 3.5 million persons or over 15% of its total 1980 population born in a foreign country.[18, 19] California has one-fourth of the foreign-born persons living in

the United States.[20] Of the new entrants, one-third are foreign-born Hispanics and 40% are foreign-born Asians.[21]

The vast majority of U.S. residents from the Pacific Rim countries are foreign-born. The Chinese had 63.3%, Filipinos 66.3%, Japanese 28.4%, Asian Indian 70.4%, Korean 81.8% and Vietnamese 90.5% of their populations born outside of the United States[22]

The composition of the Asian community will change over time because of the differential birth rates and immigration to the United States. Filipinos and Vietnamese are projected to be the largest Asian minorities by the year 2000.[23]

California, with its foreign born population and its increasingly ethnic population, is uniquely positioned to interact with the countries of the Pacific Rim. In order to increase the competitiveness of the State's products, we must better understand our existing and potential export markets. California needs to educate exporters in the language and cultures of the Pacific Rim. Immigrants and their children can be a source for California's future trade emissaries.

JOBS

There will be 15.7 million jobs in California by the year 1997.[24] That is an additional 4.4 million jobs. The fastest growing sectors will be service and construction.[25]

The high rates of jobs to population growth is attributable to higher labor force participation.

The largest number of jobs projected for the U.S. between 1984 and 1995 by the U.S. Bureau of Labor Statistics are in following occupations:

TABLE III

New Jobs (in thousands)

Cashiers	556
Registered Nurses	452
Janitors & Cleaners	443
Truck Drivers	428
Waiters & Waitpersons	424
Wholesale/Trade Salesworkers	369
Nurses Aides/Orderly	348
Salespersons/Retail	343
Accountants & Auditors	307
Teachers	281
Secretaries	268
Computer Operators	245
General Office Clerks	231

The projected new jobs for secretaries and general clerks are much lower than in 1983 projections. These reductions reflect the impact of computers. However, computer jobs are among the fastest growing jobs. Most of the new jobs are low paying service jobs.

The occupations with the fastest percentage growth as projected by the U.S. Bureau of Labor Statistics are as follows:

TABLE IV

U.S. Occupations with Fastest Percentage Growth, 1984-1995

Paralegal Personnel	97.5%
Computer Programmers	71.7
Computer System Analyst/Electronic Data Processing (EDP)	68.7
Medical Assistants	62.0

Data Processing Equipment Repairs	56.2
Electrical & Electronic Engineers	52.8
Electrical & Electronic Technicians & Technologists	50.7
Computer Operators	46.1
Peripheral EDP Operators	45.0
Travel Agents	43.9
Physical Therapists	42.2
Physicians Assistants	40.3

These occupations do not reflect the greatest growth in the number of jobs because such a small portion of the labor force currently works in each category. These occupations require specialized educational degrees or specific skill training. The occupations related to computers, (system analysts, programmers, operators, and repairpersons) are estimated to increase by about 600,000 jobs by the year 1995 and are among the occupations with the largest number of new jobs.

In California, 75% of the workers are employed in 4 of 7 sectors: services, trade, manufacturing, and government. Manufacturing and government are the relatively high-wage sectors whose share of employment has been shrinking.[26] The others are in finance, insurance and real estate, agriculture, construction, and miscellaneous.

The fastest growing sector of the basic jobs which fuel the economy (manufacturing, resources and government) in California will be in high tech occupations with a projected growth of 250,000 jobs from 1983 to 2005. Diversified manufacturing (non-high tech manufacturing) is projected to generate an additional 100,000 jobs.[27]

Although manufacturing constitutes only 17% of the total employment in California,[28] it is critical to the economy of the State because of the wealth and service jobs it generates as described in the SRI International Report. The percentage of

manufacturing jobs in California is projected to decline as a portion of total jobs because of increased productivity of workers due to improved management and the introduction of new technologies.

The Association of Bay Area Government's (ABAG) analysis of employment in the 1970's identified business services as the fastest growing segment of the services sector. It increased at a rate more than three times the overall employment growth and nearly twice the growth in the total service sector employment. It was tied to the overall expansion of the "high tech" manufacturing sector. Business services include advertising, employment agencies, data processing services, computer programming, research and development laboratories and support industries engaged in rendering service to businesses.[29]

The exceptional growth in business services in the Bay Area is consistent with the growth in "miscellaneous business services" which accounted for nearly one new job out of 20 in the U.S. between 1974 and 1984. This sector is growing nearly four times faster than total jobs in economy.[30]

The expanding service sectors, such as retail trade, contain a high proportion of low wage jobs. Five out of the thirteen occupations with the most new jobs are in this sector. The average wage in the retail trade in the U.S. in 1984 was $5.94. 20% of the workers in this sector were between 16 to 19 years old and 40% of the workers were employed part time. By contrast, workers in all industries, except government, earned $8.96 per hour with only 4% of the workforce between the ages of 16 and 19 and only 16% of the workers employed part time.[31]

The difference between the bulk of the new jobs in the low paying service sectors and the small but increasing percentage of the new jobs in high-demand, high-salary technical occupations has led to the concern that our workforce is being split into a dual

economy of the "haves" and the "have nots" or into a two-tier economy of well-paid workers and lower-paid unskilled or service workers. These trends and projections suggest the disappearance of the workers in the middle. They may account for the increased participation of women in the labor force and for the emergence in the past 15 years of two and three wage earner households as families struggle to maintain their standard of living.

EXAMPLES OF A TWO TIER ECONOMY IN CALIFORNIA

The Urban Institute's analysis of the Los Angeles area in THE FOURTH WAVE describes a two-tier employment system--a tier of better paid prominently nonimmigrant workers and a tier of very low-paid immigrant workers.

The study found that the 1970's growth in low-paying manufacturing jobs (filled by Hispanic immigrants with low levels of education) depressed the wages in production industries, such as apparel and textile and in relatively low-wage industries such as restaurants, personal services and hotels. By contrast, in other sectors of the economy where fewer immigrants were employed, the wages rose as fast or faster than the national average. In fact, the wages of all employees rose 9% more rapidly in Los Angeles than the rest of the nation between 1972 and 1980.[32]

The lower earnings of Hispanic immigrants led to an expansion of the manufacturing activities, expanded payrolls and increased profits. When Hispanic immigrant households were excluded, Los Angeles had high proportions of middle and upper-middle income households, one of the highest in the nation, and had relatively few households with very low incomes or workers in low-wage occupations. When the households of Hispanic immigrants were included, the income structure was similar to other metropolitan areas.

"The net result was to preserve the area's competitive advantage in manufacturing and to modestly increase profit margins. In addition, area prices in restaurants and for personal services dropped somewhat, relative to those elsewhere in the nation, although prices for other goods and services did not fall perceptibly. As had been the case during earlier immigration wave, the depressed wages in low-skill jobs caused more such jobs to open up. In manufacturing sectors with declining employment nationally, additional jobs for skilled and white-collar workers were created in Los Angeles to complement unskilled production jobs."[33]

The study also found that one half of recent immigrants to California settled in Los Angeles County; the majority of recent immigrants were undocumented. Of the 645,000 jobs that were added in Los Angeles County between 1970 and 1980, recent Mexican immigrants held about one-third, while other recent immigrants held somewhat more than a third.[34]

Another recent study, one of the San Francisco Bay Area, suggests long term growth based upon high technology may also lead to a two tier economy.

The percentage increase in the Bay Area's total employment was 116% from 1962 to 1982. It compares favorably with the U.S. growth rate of 71% and California's growth rate of 105%.[35]

Of the new manufacturing jobs in the Bay Area, some 195,000 jobs or 83% were in the high tech fields of electronics, instruments and non-electrical machinery. These three employment categories represent 48% of all the manufacturing activities in the Bay Area. Without these high tech jobs, the manufacturing sector would have hardly grown. By contrast, in the Los Angeles area 60% of the growth in manufacturing was outside these three high tech categories.[36]

Santa Clara County added 235,952 or 89% of the Area's manufacturing jobs. The rest of the counties in the Bay Area added only 29,117 manufacturing jobs.[37]

The Bay Area, with its dependence upon Silicon Valley and electronics, instruments and non-electrical manufacturing, is in the same position that Detroit is with the auto industry. Major changes in the electronics industry will have a profound impact on the entire region unless there is more diversification. The reopening of the General Motors/Toyota plant in Fremont is a step in the right direction.

Sixty-three percent of the new jobs in the Bay Area from 1962-1982 were in the service sector (retail trade, finance, insurance and real estate and insurance). This is somewhat less than the national growth in these sectors. As stated above, the fastest growing service sector was business services.[38]

Although, per capita income is higher in the Bay Area than national per capita income, the rate of growth in per capita income in the Bay Area did not keep up with the growth rate nationally.

If this employment trend continues, ABAG estimates that 50% of the job growth from 1980-1990 will occur in those service and trade occupations in which more than 80% of the employees will be earning the mean income or less for all occupations (i.e. 80% will be earning the average wage or less and only 20% will earn above the average wage).[39]

For an area where the cost of living is one of the highest in the nation, any projection suggesting a continual decrease in real per capita income is cause for concern.

LABOR FORCE

The California labor force is projected to grow to 17.5 million by the year 2000.[40] That is an increase of 5.8 million since 1980 or a 50% increase in a 20 year period.

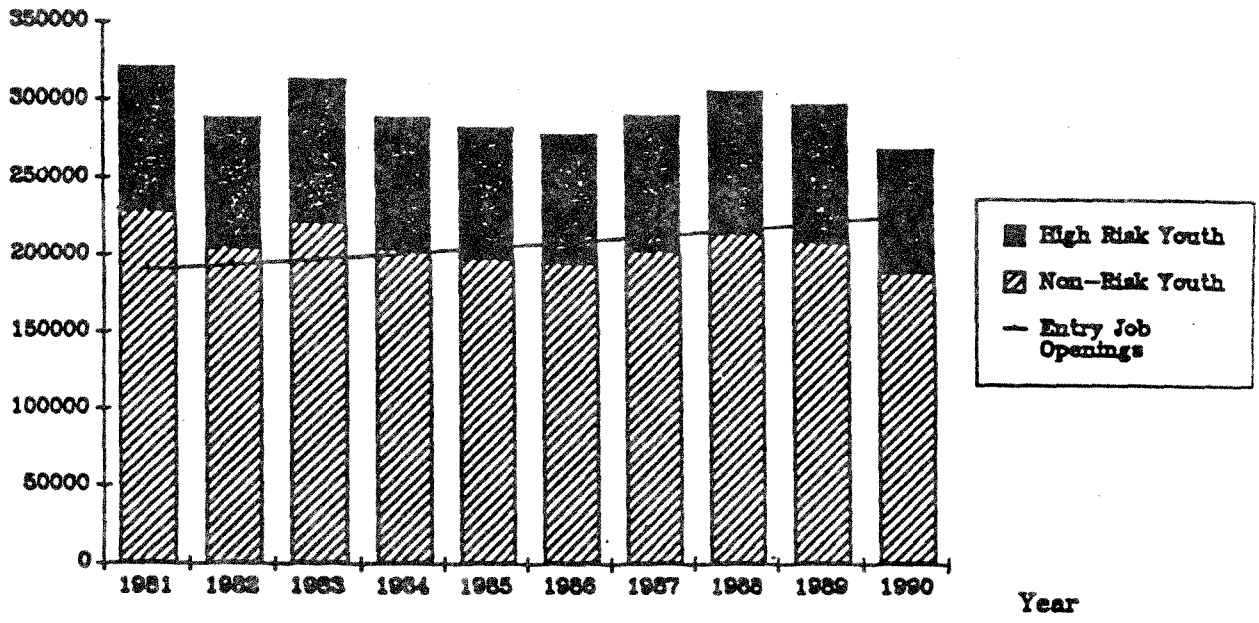
The growth in the labor force is based upon current population, immigration, and the increased participation of women in the labor force. These estimates also assume that there will be new jobs for new workers.

The labor force will grow more slowly than in past years and it will age with the baby boomers. The fastest growth will occur in the 25-54 year old group, the result of the baby boomers and young immigrant workers in this category. The labor force will grow more rapidly in California than in the nation.

Between 1983 and 1995 the U.S. youth population (16-24 year olds) will continue to decline. On a national level this may mean that the business demand for entry level workers will depend upon "at risk" youth. In California, the labor force participation of the 16-24 year old group will decline from 24.8% to 17.7% of the total labor force. See the following chart.[41]

Figure 2

ILLUSTRATIVE SHORTAGE OF QUALIFIED ENTRY LEVEL WORKERS FOR CALIFORNIA



NOTE: Chart prepared to illustrate emerging relationships, not provide precise figures. Average annual entry level job openings estimated on basis of expected 1.9 percent average annual job growth during the 1980-90 decade (Monthly Labor Review, November 1983, page 14). A high rate of job growth was slected because California commonly grows more rapidly than the nation. It was assumed that roughly half annual job openings are entry level. Number of entry level workers entering the labor force between ages 14 and 24 estimated as number of labor force participants among those reaching age 18 each year during 1980-90 period.

The labor force's projected growth, will reflect the changing ethnic composition of the State.[42]

TABLE V

	Year 1980 Percent of Labor Force	Year 2000 Percent of Labor Force
Non-Hispanic White	69.5	54.5
Hispanic	17.3	28.8
Asians	6.5	11.5
Blacks	6.7	7.2

In spite of the difference between low-paid occupations with the largest number of new jobs and the well-paid fastest growing percentage of new jobs, some argue that sectors growing most in the U.S. economy and those with the best prospects for future growth require higher skills and flexibility among their workers. They argue, to the extent that some jobs are de-skilled and flexibility routinized, they will relocate offshore because of lower wages.

The areas where the United States--and other developed countries--seem best positioned to compete are in the advanced manufacturing, sophisticated service and knowledge-based industries where human resources are a crucial element. "In fact, it is difficult to name a single American industry which is successful in international markets today that is primarily dependent on low-cost, unskilled labor."[43]

The Office of Technology Assessment, for example, states that although most data entry is still done in the United States, in the next 10 to 15 years all signs indicate it will move offshore. Currently, 40 United States companies have data entry facilities in India, China, South Korea, Mexico, Jamaica, and other developing countries. The data entry operators in the Philippines are made up of women who have the equivalent of junior college degrees and are paid much less than in America. In the Caribbean, data entry clerks are paid $15 to $60 (U.S.) per week. In other countries the wages are much lower.[44]

Clearly, California lawmakers want to adopt policies which will encourage the expansion of advanced manufacturing, sophisticated service and knowledge-based industries. These jobs coupled with those in our resource industries maintain California's base for economic growth.

California must maintain an educated and skilled workforce if it is to compete for the new jobs which will generate wealth and

high wages. Unless California's educational institutions learn how to educate the growing Hispanic and Black populations, the overall quality of our workforce will decline compared with other states.

It is projected that the national adult labor force (25 years or older) will become more educated in 1990 as older workers with less education retire. This might occur in California but it will be offset by the low educational level of Hispanics and Blacks, who will become 36% of the labor force by the year 2000 unless measures are adopted immediately to increase the educational achievement of Hispanic immigrants and their children, and Blacks.

For example, in 1981, 1 out of 5 men 25 years or older in the U.S. labor force lacked a high school diploma, and by 1990 the corresponding figure is projected to be 1 out of 7; the proportion of women 25 years or older in the labor force who lack a high school diploma is projected to drop by 1990 from 1 out of 6 to 1 out of 10.[45]

In 1983, 82.2% of the national adult labor force (25 years or older) had at least a high school diploma. This educational achievement varied by ethnic group with 45.4% of the Hispanic, 29.4% of the Blacks and 16.5% of the Whites not completing high school; and 9.9% of the Hispanics, 13.1% of the Blacks and 25% of the Whites completing four or more years of college.[46]

ADULT EDUCATION AND TRAINING

With an estimated 90% of the national workforce in 1990 and 75% of the workforce in 2000 already in the labor pool,[47] the education and retraining of the existing labor force is critical. These percentages may be somewhat lower for California than the rest of the nation, due to immigration and California's younger

workforce, but it is clear that the vast majority of our State's future workforce is already in the labor market.

If the State is to develop policies which encourage the growth of well paying jobs in both the advanced manufacturing and service industries, it must assure employers of an educated, skilled and adaptable workforce able to operate in advanced manufacturing facilities producing custom made products for a specialty market or to process information and provide the services in a technologically complex world.

The challenges confronting the State are great in the face of disturbing statistics about the lack of educational achievement within large segments of our population. This population must have access to education or they will be relegated to low-paying jobs.

California's educational institutions must provide basic education, even though U.S. corporations are annually spending $40 billion on education and training of their employees, not including employee compensation.[48] Otherwise, California's employers may be forced to move to other states which have a more literate population.

Twenty-five percent of California's adult population was found to be functionally illiterate. These estimates were based upon a 1979 adult competency survey. The State Department of Education estimated that 4 to 4.5 million adults are functionally illiterate and only about 6.4% of those are receiving some kind of literacy instruction. While there is no agreed-upon definition of illiteracy, national studies state between 13% to 25% of our population is illiterate.[49] Given the increasingly complex information-based service economy that is evolving, the more stringent definition of literacy which requires the population to understand what it reads may be more appropriate. This definition leads to the higher estimate of illiteracy.

A 1981 Participation in Adult Education study reported that an estimated 21 million people in the U.S. were taking adult education courses. However, most of these courses were taken by individuals in white collar jobs - those who already are literate.[50] In addition, 80% of the courses were taken to improve or advance in a current job. Only one-half million were taken by individuals proposing to enter new occupations.

The National Commission on Employment Policy concluded 1) that adult training and education are concentrated among those who are already doing relatively well in the labor market; 2) that most adults in the labor force are able to obtain employment; and 3) that a significant number of individuals, concentrated among Blacks and Hispanics, face serious unemployment problems.

They supported initiatives to improve the education and training of minorities and individuals with less than a high school education.

Scarce public resources should be targeted to assist those who need adult education for occupational mobility and to overcome their deficiencies in education. Access to education will allow the educationally disadvantaged, particularly minorities and new immigrants, to move into better paying jobs.

The training and retraining of workers, particularly in manufacturing but also in services, needs to be upgraded to accommodate the economic and technological changes.[51]

Model Program

The Senate Select Committee visited a model program in Los Angeles. It was a joint partnership between the public and private sectors. Mobile trailers, which house expensive computer assisted design (CAD) and computer assisted manufacturing (CAM) equipment were located at the worksite of an aerospace employer.

The community college provided instructors to teach workers how to use the equipment. These workers would have been displaced by the CAD/CAM equipment; instead they learned to operate it during regular working hours. When their training is completed, the trailer can be moved to another worksite.

As California's industries use more flexible and automated manufacturing processes to be competitive, workers who would have otherwise been displaced can be retrained on the job in mobile trailers. The CAD/CAM training allows workers to produce higher quality parts at a faster rate.

These partnerships between government and the private sector also work in the service industry. The Bank of America has used the Employment Training Panel to retrain bank tellers to perform other functions such as operating computers.

K-12 EDUCATING OUR CHILDREN--OUR FUTURE

The changing ethnic composition of California's schools will occur more rapidly with minorities becoming the majority by the year 2000. Even in 1985, major school districts like Los Angeles Unified already had a majority of minority enrollments.

TABLE VI

Persons of School Age 5-19 by Racial/Ethnic Background[52]

	1980	2000
White	59.3	44.7
Black	8.9	7.8
Hispanic	24.7	35.2
Asian	5.6	10.8
Other	1.5	1.5

The changing ethnic composition of the State will adversely impact on the State's ability to maintain an educated, skilled and adaptable workforce unless action is taken immediately to identify and expand programs which will increase the educational achievements of Hispanics, Blacks and underachieving Non-Hispanic Whites.

Attrition Rate

The attrition rate in California's high school class of 1984 was 30%.[53] California ranked 34th in the nation in its graduation rate as measured by attrition.[54] California's attrition rates varied greatly by ethnicity at 15% for Asians, 25% for Non-Hispanic Whites and 43% for Blacks and Hispanics.[55] Even though a higher percentage of minorities dropped out, there were more Whites who dropped out of the Class of 1984. These rates were not adjusted for the one-third who later returned to continuation school or adult schools.[56]

A recent study of the 1980 census data on Mexican immigration found that, in contrast with the State Department of Education attrition rates and high school completion rates in the U.S. described above, the first and second generation native-born Hispanics had a high school completion rate similar to the State's total of 80% to 82%.

School enrollment rates are close to the State average for native-born Hispanics until mid-high school, when enrollments for the first generation native-born begins to drop. The enrollment rate in high schools for Mexican-born residents is only half the State's total.[57]

Test Scores

The scores on the National Scholastic Aptitude Test (SAT) in 1984 varied greatly by ethnicity in California: 932 for Whites, 917 for Asian/Pacific Islanders, 817 for American Indians, 796 for Hispanics, and 715 for Blacks.

Throughout the 1970's there was a steady decline in academic achievement on all standardized tests in California. Recently there has been some improvement in test scores but they are substantially below the levels of achievement in the 1960's. [58]

For the first time, the California Assessment Program (CAP) collected its results by ethnic background for eighth graders. These scores confirmed what informed observers perceived in their local school districts--that academic achievement varies by ethnicity.

TABLE VII

California Assessment Program Average Scores 1985[59]

	%	Reading	Writing	Math
All Students	(100%)	240	246	251
Non Hispanic Whites	(53%)	271	274	278
Filipinos	(3%)	252	271	267
Asian/Pacific Islander	(7%)	247	262	293
American Indian	(3%)	202	207	213
Hispanics	(24%)	194	203	204
Blacks	(9%)	189	196	189
nonresponse	(2%)	219	224	229

The average score for Non-Hispanic Whites was about one third higher than those of Blacks and Hispanics.

This baseline ethnic data on the CAP should be collected and analyzed over time to ascertain the extent that education reform is impacting on each ethnic group.

Employers Push for Reform

In reaction to the declining level of academic achievement for high school graduates and the greater reliance on a pool of "at risk" youth for entrants into the labor force, employers began to specify the characteristics they want in entry level high school graduates. **Employers want high school graduates who have a command of English; have the capacity to reason and problem solve; are able to read, write and compute, have an understanding of science and technology; are able to interact with others and possess positive work habits and attitudes.**[60]

These characteristics do not include any vocational education *per se*, except to the extent that work experience may lead to positive work habits. The tendency of schools to track students who have not mastered basic academic skills into vocational education probably reduced the employability of vocational education students as a whole. Consequently, technical skills taught in the vocational education curriculum are not valued by employers.

The National Commission on Education Policies found that vocational education in comprehensive high schools has not been responsive to changes in skill requirements, when compared to vocational schools and special vocational high schools.[61]

Employers in California also have similar views about entry level workers. The Business Roundtable, reacting to their findings of K-12 education, sponsored a major reform of the K-12 program in SB 813 of 1983 in order to secure better qualified entry level workers. These reforms established graduation requirements, increased the school day/year, established the mentor teacher program, set model curriculum standards, created leadership training for administrators, authorized specialized high schools, and provided additional funding for instructional materials, etc.

One of the consequences of strengthening academic standards has been a reduction in the number of vocational education classes. This occurred because there was less time available for students to take electives. In light of the National Commission finding just cited this may not be a bad consequence for comprehensive high schools.

The Pittsburgh, Pennsylvania School Board with community support adopted a program called MAP (Monitoring Achievement in Pittsburg) to establish district-wide goals for each subject and grade level as well as an instructional model called PRISM (Pittsburg Researcher-Based Instructional Supervisory Model) to train and evaluate teachers.

Instructors attend an eight week refresher course at a high school which is used as a teacher center. The teaching concepts are not new, but are simply reinforced as teachers observe others teach and are observed as they themselves teach. It is an educational experience which is designed to develop effective classroom techniques.

The results have been startling. In four years all the city's public elementary and middle school scores have risen above the national norm in academic tests. Whereas, in 1981, half the schools were below the norm. Also, the high school dropout rate was reduced from 35% five years ago to 21%.

California School Reform

To improve the performance of K-12 students is a complex process. Factors to consider are a) administrative leadership in setting goals for a school and working with teachers, parents and the community to achieve these goals; b) trained teachers; c) a school environment which is conducive to learning; and, d) proper instructional equipment and materials.

The reform measures in SB 813 are consistent with the Pittsburgh Model.

There is growing recognition that California must continue to address reforming our K-12 system. **The recommendations of the California Commission on the Teaching Profession should be supported,** particularly the ones which recognize the need to restructure teaching careers, to establish rigorous professional standards and to redesign the school as a more productive workplace for teachers and students.

SCHOOL ADMINISTRATORS

Studies of school effectiveness consistently conclude that the principal's ability to exert leadership is essential for creating a school climate that promotes learning.[62]

In California, there are effective high schools serving poor and minority students. Some of the reasons for success in these schools include: parental interest, the stability of the surrounding community and the extent to which the school is perceived to be a valuable part of the community.

Faculty and administrators at these effective high schools serving minority and poor students, share a common sense of purpose that guides the development of curriculum, influences classroom and administrative procedures, and related instructional procedures to measurable outcomes. They are able to cite statistics which measure the school's success and use data to make changes in instructional programs. Teachers identified incoming students' strengths/weakness and assigned them to appropriate classes. They also believe that poor and minority students can learn and that their schools can make a difference.[63]

A recent study found that the number of individuals holding a degree in the administrative services program far exceeds the number of available positions until 1990. The reason so many teachers have completed the required course for an administrative credential is the higher wages paid to administrators.[64] Also, Schools of Education provide the courses for the administrative credential may have a fiscal incentive to not screen out applicants or students without leadership qualities if they do not have a large applicant pool.

Given the critical leadership role that superintendents and principals play in their setting the standards in their schools, a major component of any reform in the school system must be to enhance the leadership of administrators.

Classroom of the Future

There is growing recognition of the need to change the credentialing requirements for teachers and to provide California's students with smaller class size. These controversial and important issues will be debated as the next steps to be taken in school reform. In the words of George Leonard in an article in Atlantic Monthly, these do not lead to:

> "fundamental reform. ...The resulting school would be pretty much the same as the school of a hundred years ago. Teachers would still be standing or sitting in front of some twenty to thirty-five mostly passive students of the same age and giving out the same information at the same time to all these students, regardless of their individual abilities, cultural backgrounds, or learning styles... It was perhaps adequate in 1884, when less than 5% of America's sixteen-year-olds were in school. It is terribly inadequate in 1984, when 90% of our sixteen-year-olds--a culturally, emotionally, and intellectually diverse

group--are in school. Over the past hundred years almost every aspect of our national life has changed almost beyond recognition. Our schools remain essentially the same."[65]

George Leonard advocates the use of modern technology in the classroom to provide individualized, self paced instruction to move classroom activity out of the "horse and buggy days."

It may take time to develop an effective classroom of the future; however, there are some promising examples in the use of computers in the classroom.

° Computer assisted instruction (CAI) proved effective in increasing the math scores from 50% for the control group to 64% after the first year, 71% after the second and 76% after the third year for the experimental group. This was achieved by providing 3rd to 6th graders 10 minutes of drill and practice in math. Students began the program at a level where they achieved a 90% correct score in their diagnostic drills. They progressed at their own rate. The program was not integrated into the classroom curriculum.[66]

° Computer assisted instruction ranked second in cost effectiveness among four important interventions for improving math and reading achievement at the elementary school level when specific programs with cost data on each intervention were compared. It ranked above reducing classroom size and increasing instructional time. It ranked below cross-age tutoring, which is the tutoring of younger students by older students.[67]

The only major intervention to be addressed by SB 813, increasing instructional time, was found to be the least cost effective.

- Basic skills and higher-order thinking skills were improved in Title 1 students who participate in a Higher-Order Thinking for Compensatory Students.[68]

- In 39 of 48 studies, secondary students received better exam scores from Computer-Based Instruction than from conventional teaching methods. There were greater results in teaching the disadvantaged and low and average ability students.[69]

A recent study suggests that CAI and other technologies have not fulfilled this "promise" because of the primary focus on hardware instead of software, other resources, and an instructional setting, all of which are necessary for successful implementation of the technology in the school instructional program.[70]

CAI is a form of interactive instruction. "This technology is used to teach a specific subject or skill directly to a student, guiding the learner through a sequence of steps involving the presentation of information, drills and exercises designed by an instructor. Interactive instructional systems require the student to communicate with the device, allowing the system to vary the pace of instruction, select among alternative sequences of presentations, test for understanding, and alter the content according to the specific needs of the individual."[71]

Computers can also be used by teachers in the management of a classroom. They can assist in daily tasks such as grading and record keeping. One program has been developed to grade standardized tests for the teacher. The student's test grades are kept and recorded for both the principal and the teacher. If the student makes consistent errors on tests, the computer identifies the necessary homework assignment to correct the deficiency.

Having computers in classrooms does not assure that they are integrated into the instructional program. Most of the computers are used (to teach the computer) as a tool, rather than providing interactive instruction.

It takes teacher training, curriculum development as well as the appropriate hardware and software before computers and other technologies can be integrated into the instructional program.

Because of the expense and complexity of developing good educational software and the uncertainties of the educational market, the Office of Technology Assessment was not convinced that good software would be developed even with incentive funding from the federal government.

"There is considerable skepticism - especially within the software industry - about the school market and its potential. Industry representatives are concerned about the difficulty of segmenting the software market in order to develop products targeted to particular grade levels and subject matter needs. .. At the same time, the up-front costs associated with courseware development - estimated by one industry representative at over $250,00 per package - is more than most firms, given the market uncertainties, want to risk on an 'unknown quantity.'"[72]

Software developers stress the need for the development of a new programming language which would be more flexible and would be easier to develop interactive instructional programs.

SCIENCE AND MATH

More than 1400 mathematics and science teaching vacancies were filled by non-math and non-science teachers in the 1984-85 school year; 2000 to 2500 math and science vacancies were predicted for the 1985-86 year. Fewer than 500 science and math teachers are produced by California's universities and colleges.[73]

One of the few comparisons between American, Taiwanese and Japanese first and fifth grades found that only fifteen American children in the first grade ranked in the top 100; by the fifth grade only one American child was in the top 100 students.

Another startling finding was that not one of the 20 American fifth-grade classrooms selected in the study attained an average score in mathematics equivalent to the score in the worst-performing Japanese classroom.[74]

Many unqualified math and science teachers are currently teaching in our elementary and secondary schools. The Math Science Task Force of the California Roundtable found that barriers to recruiting more qualified math and science teachers were low salaries, absence of career ladders for teachers, the lack of prestige of the teaching profession, and the school environment itself. In addition, they identified problems with outdated and poorly written textbooks, a shortage of adequate classrooms and laboratory facilities, lack of proper equipment, and inadequate faculty training on how to use the available equipment.[75]

The Task Force recommended that within a 5 year period qualified teachers be trained and recruited to teach math and science. Of particular concern was reviewing the credentialing requirements for elementary school teachers to assure they are qualified to teach math and science.

As long as industry generates a great demand for graduates in math and science, and unless math and science teacher's salaries are significantly increased, it may be difficult for schools to attract and retain such qualified teachers.

LACK OF FOREIGN LANGUAGE TRAINING

As described in the Trade Section of this report, California must educate its population in the languages and cultures of the Pacific Rim if we expect to export our products to Pacific Rim countries.

In spite of the large proportion of foreign-born Asians and Hispanics in the U.S. and California, very few of California's university students are majoring in foreign languages of the Pacific Rim.

There are only 244 University of California (U.C.) students majoring in Asian Studies or languages. The University of California operates an overseas program, but only 39 students are enrolled in Asian countries. By contrast 2,000 students from the six Asian trading partners are studying on U.C. campuses. These do not include the resident alien enrollment.[76]

In the California State University System (CSU), between 3,000 and 5,000 students were enrolled in Chinese or Japanese language classes. Yet, more than 4,600 students were on visas from the Pacific Rim.[77]

The Regents of the University of California have approved a School of Pacific Basin International Studies for the San Diego campus. It would educate 500 graduate students in international relations.

The Industrial Competitiveness Task Force recommended that scientific and business documents be routinely translated into English and made available to the public and private sectors. The Japanese translate many of our documents and closely follow developments in our business and scientific communities. In certain areas of research, such as the Center for Magnetic Recording Research in San Diego, translating scientific documents from Japanese to English is being accomplished because of its importance to research.

NONRESIDENT ALIEN GRADUATE STUDENTS IN ENGINEERING AND COMPUTER SCIENCE

Thirty four percent of the University of California's graduates in Engineering and 23.8% of its graduate students in computer science are nonresident alien students. Fourteen percent of the graduate students in engineering and 17% of of the graduate students in computer science in the California State University System are nonresident alien students. [78]

These statistics are of concern since one of the ways the universities achieve technology transfer is through the placement of students in private sector jobs. Given the high percentage of nonresident alien graduate students in highly technical areas, the question must be asked if the State's subsidized university system has transferred technology to California and U.S. competitors by providing such a large percentage of its graduate training in the past 3 to 5 years to nonresident alien students.

Further analysis of the Commission's data shows that **67.3% of the U.C. graduate students and 32.1% of the CSU graduate students enrolled in industrial engineering are nonresident alien students.**[79] This is the highest percentage of nonresident alien students in any of the engineering specialities. It may reflect the importance of the manufacturing process in other countries.

The concentration of nonresident alien students within this specialty is particularly disturbing since the Committee's analysis indicates that California's industries must compete in the manufacturing of products. While California still leads in innovating new products, it must upgrade its factories to produce high quality goods cheaper and faster if it is to compete in the global economy and maintain California's productivity and standard of living.

Because of the importance of upgrading the manufacturing process, the Industrial Competitiveness Roundtable endorsed the concept of establishing a Center of Excellence on the Manufacturing Process. It is ironic that if such a proposal is adopted, the immediate beneficiaries would be the graduate students in the programs to be upgraded, the majority of whom are nonresident alien students.

Another engineering specialty in U.C. with a high percentage of nonresident alien graduate students (43.5%), which probably should be reviewed, is nuclear engineering.[80]

The Postsecondary Commission states there were 342,000 nonresident alien students in the U.S. in 1984. It was not until recently that the public became aware that these students were concentrated in high cost, high demand programs. This pattern emerged without any explicit policy. It probably reflects the openness of the U.S. educational system and the lack of a federal policy on nonresident alien students.

California enrolls more than twice as many science and engineering non-resident alien graduate students than any other state except for New York. Other states with high percentages of nonresident alien graduate enrollment are Texas, Massachusetts, Illinois, Ohio and Michigan.

California's research and development expenditures for engineering by academic institutions exceeds those in other states. (We spent $139 million in 1983, Massachusetts spent $99 million and New York spent $80 million.)

Furthermore, a high percentage of the doctorates in engineering were granted to nonresident alien students. This may reflect the fact that domestic students go to school part time and the nonresident aliens may be better qualified when they entered the program.

Taiwan supplies more U.C. nonresident alien graduate students than any other nation. Other nations with high numbers at U.C. are Hong Kong, India, Korea, Iran and People's Republic of China. Taiwan also is the leading supplier of graduate students in the State University system followed by Hong Kong. Other nations with significant enrollments are India, Jordan, Lebanon and Korea.[81]

The Commission was unable to secure information on the percentage of nonresident alien graduate students who remained in California or the U.S. to work. A 1983 earlier report to the Legislature stated that 50% to 60% of U.C.'s nonresident alien students in mechanical engineering, and naval architecture and offshore engineering remained to work in the U.S after receiving their doctorates. About 50% of these remained in California to work in industry or in higher education. It is indeed unfortunate that the Commission was not able to update the University of California's earlier findings.

The university systems still admit a higher percentage of domestic applicants into graduate programs than nonresident alien applicants. Most of the U.C. campuses have established a policy of limiting the percentage of nonresident alien graduate students or are reviewing their policy.

PERSONNEL POLICIES

Other sections of the report address the need for research, and training of engineers and managers in the manufacturing processes. Advanced manufacturing must be applied throughout our basic manufacturing industries if California is to maintain its manufacturing base. The required research and training in the manufacturing process must address not only robotics and computers but also management of workers.

According to an analysis in 1983, Toyota has a $1,718 cost advantage (after shipping) over General Motors in producing a small car. Some of this advantage is due to lower wages and fringe benefits ($550), and some is due to superior technology ($73). But about $1,000 of this difference is attributable to skill in utilizing existing human resources.[82]

One of the findings of a survey of jobholders who experienced significant technological changes on their jobs (44%) in the last five years was that more than three-quarters say the changes have made their work more interesting, and more than half say that the technological changes have given them greater independence.

There has not been an increase in commitment in work, even though workers have experienced an increase in discretion over their work. Only 23% say they they are working at full potential, and nearly one half say they do not put in much effort into their jobs over what is required to keep their jobs; and three-fourths say that they could be significantly more effective on their jobs.[83] Managers in these situations must change their practices to increase productivity.

Another surprising finding is that American workers still describe themselves as having a need to do the very best job that they can. Fewer than one-third reject the work ethic in favor of other motivations.[84] Workers feel this way, in spite of the fact that 73% percent of the workforce say that the quality and the amount of effort they put into their job has very little to do with how much they are paid. Three-fourths also say that the absence of a close relationship between pay and job performance is one of the main reasons why work effort has deteriorated; everyone gets paid the same regardless of their effort.

Workers feel that there is little connection between the productivity of their firms and their own welfare. Only 13% of Americans believe they are the prime beneficiaries of increased

productivity. They see the benefits going primarily to their employer. By contrast, 93% of Japanese workers believe they will benefit from improvements in their employers' profitability.[85]

Another aspect of personnel practices which leads to increased productivity is "employment security". "Employment security" is not "job security" nor is it "income security." As described by the Work in America Institute Policy Study, it advocates not a guarantee of lifetime employment with one employer or permanent rights to a job, but a steadily growing opportunity for employees to continue in gainful employment, preferably with the same organization, for as long as they wish.

When an employer adopts such a policy, it increases the security of employees and productivity of an organization in implementing such a policy. In implementing such a policy, an employer must make careful plans for the future. Employment security creates an environment in which automation and new technologies are not threatening to the employees.

FOOTNOTES

1. Robert Reich, The Next American Frontier.

2. Population Research Unit, Department of Finance, "Projected Total population of California counties July 1, 1980, to July 1, 2020, Fall 1983, estimates 31.4 million persons in the state by the year 2000."

Leon Bouvier and Phillip Martin, Population Change in California's Future, Population Reference Bureau, Inc., 1985, page 12, estimates the population in 2000 at 31.88 million.

3. Bouvier and Martin, page 2. Derived from information.

4. Op. cit. page 18.

5. Kevin McCarthy, The Slow Growing Orange: A Demographer's Look at Future Los Angeles, 1984, page 1.

6. Bouvier and Martin, page 18.

7. Robert Arnold and Stephen Levy, Projections of Economic and Demographic Variables for CFM 6, August 1985, page 53.

8. Population Research Unit, California Department of Finance.

9. Ibid.

10. Loc. cit.

11. Bouvier and Martin, page 13. This is higher than those cited on page 23 of the Projections of Hispanic Populations for California for 1990 and 2000 by the Center for Continuing Study of the California Economy, 1982.

12. Loc. cit.

13. Bouvier and Martin, page 14.

14. Op. cit., page 43.

15. Op. cit., page 45.

16. International Laborers Office Geneva, Year Book of Labour Statistics 1984, 44 issue, page 681.

17. Kevin McCarthy and R. Burciaga Valdez, op. cit., pages 14-15.17.

18. Bouvier and Martin, page 3.

19. U.S. Census Worksheet for California Race/Ethnicity by Sex and Age.

20. Muller, Thomas. The Fourth Wave: California's Newest Immigrants (A summary), Urban Institute Press, Washington, D.C., 1984, page 6.

21. Bouvier and Martin, page 5.

22. Robert Gardener, Bryant Robey, and Peter Smith, Asian Americans: Growth, Change and Diversity, Population Reference Bureau, volume 40, #4, October 1985, page 5.

23. Bouvier and Martin, page 15. However, Robert Gardner et al projects that Phillipinos will constitute 21% of the Asian American population in the U.S. in 2000; Chinese 17.1%; and Vietnamese 16%.

24. Arnold and Levy, page 44.

25. Op. cit., page 34.

26. Bouvier and Martin, page 26. Arnold and Levy cite 75% of state jobs will be these categories by 2005.

27. Arnold and Levy, page 26.

28. Bouvier and Martin, page 26.
Arnold and Levy, page 35.

29. Raymond J. Brady, Association of Bay Area Governments, Working Paper #1, Perspectives on a Region's Growth: Maintaining the San Francisco Bay Area Economy, September 30, 1985, page 5.

30. Chester C. Levine, "Miscellaneous Business Services: Little Known But Growing Fast," Occupational Outlook Quarterly, Summer 1985, page 21.

31. Daniel Hecker and Ludmilla Murphy, "Retail Trade: Millions of Jobs, No Experience Necessary," Occupational Outlook Quarterly, Summer 1985, page 14.

32. Muller, page 15.

33. Op. cit., page 16.

34. Op. cit., page ix.

35. Raymond Brady, page 1.

36. Op. cit., page 2.

37. Op. cit., page 8.

38. Raymond Brady, Association of Bay Area Governments, Working Paper #2, "Economic Growth and Wealth, Looking at the San Francisco Bay Area," October 1, 1985, page 2.

39. Ibid.

40. Bouvier and Martin, page 25.

41. California State Job Training Coordinating Counsel, "Tomorrow's Workers At Risk," October 1985, page 9.

42. Bouvier and Martin, page 11.

43. SRI International, "Investing in People: New Directions in Developing Human Capital to Meet the Needs of a Dynamic Economy," July, 1985, page 2.

44. John Maxwell Hamilton, "How American Computer Firms Enlist Far Flung Low Cost Workforce Overseas, Christian Science Monitor, January 27, 1986, page 17.

45. Burt S. Barnow, National Commission for Employment Policy, The Education, Training and Work Experience of the Adult Labor Force from 1984 to 1995, page 70.

46. Op. cit., page 8.

47. SRI International, page 12.

48. Nell Eurich, Corporate Classrooms, The Carnegie Foundation for the Advancement of Teaching, page 6.

49. Lenny Goldberg and Associates, "Literacy, Employment and the California Economy: Policy and Program for the California Literacy Campaign," July 1, 1985, page 3.

50. Barnow, page 15.

51. Op. cit., page 72, 73 & 74.

52. Bouvier and Martin, page 37.

53. State Department of Education, "California Public Schools, Attrition Rates, Class of 1984, by Racial/Ethnic Designation," 8-15-85.

54. Assembly Office of Research, "Dropping Out, Losing Out: The High Cost for California," September 1985, page 9.

55. State Department of Education.

56. Assembly Office of Research, page iii.

57. Kevin McCarthy and R. Burciaga Valdez, Current and Future Effects of Mexican Immigration in California, Executive Summary, Rand Corporation, November 1985, pages 29-30.

58. California State Department of Education, California Assessment Program, Student Achievement in California Schools 1984-85 Summary of results, page 5.

59. State Department of Education, Survey of Academic Skills: Grade 8 - 1985, Subgroup Results Table E, Ethnic Background.

60. Panel on Secondary School Education for the Changing Workplace, High Schools and the Changing Workplace, The Employer's View, National Academy Press 1984, pages 20 to 27.

61. Sue E. Berryman, National Commission on Employment Policy, "The Adjustment of Youth and Educational Institutions to Technologically-Generated Changes in Skills Requirement," May 1985, page 66.

62. Cathy Minicucci, Assembly Office of Research, Overcoming the Odds Making High Schools Work, page 21.

63. Op. cit., pages 2 and 5.

64. William Gerritz, Julia Koppich, James W. Guthrie, Policy Analysis for California Education, University of California, "Preparing California School Leaders: An Analysis of Supply, Demand and Training," page 3.

65. George Leonard, "The Great School Reform Hoax," Esquire, April 1984, pages 48-50.

66. Marjorie Ragosta, Paul Holland and Dean Jamison, Computer Assisted Instruction and Compensatory Education, Educational Testing Service and Los Angeles Unified School District, pages 8 and 9.

67. Henry M. Levin, Gene V. Glass, and Gail R. Meister, "Cost Effectiveness of Four Educational Interventions," Institute for Research and Educational Finance and Governance, School of Education, Stanford University, May 1984, page 29a.

68. Stanley Pogron, Barbara Buchanan, "Higher Order Thinking for Compensatory Students," Educational Leadership, September 1985, page 45.

69. James Kulek, Robert Bangert, and George Williams, "Effects of Computer Based Teaching on Secondary Students," Journal of Educational Psychology, February 1983, pages 19-26.

70. Harry M. Levin and Gail R. Meistler, Educational Technology and Computers: Promises, Promises, Always Promises, Institute for Research on Educational Finance and Governance, School of Education, Stanford University, November 1985, page 9.

71. Kulek, Bangert, and Williams, op. cit., page 56.

72. Op. cit., page 146.

73. Math Science Task Force, California Roundtable and California Round Table on Educational Opportunity, Press Release, June 26, 1985.

74. Harold W. Stevenson, "Making the Grade. School Achievement in Japan, Taiwan, and the United States," Center for Advance Study in the Behavioral Sciences, Stanford, CA. April 29, 1983, page 43.

75. Cathy Miniccuci, Assembly Office of Research, Overcoming the Odds Making High Schools Work, page 21.

76. Data supplied by University of California.

77. Data supplied by California State University System.

78. California Post Secondary Education Commission, Foreign Graduate Students in Engineering and Computer Science at Californis'a Public Universities, A Report to the Legislature, December 15, 1985. Draft, Display 5.

79. Loc. cit.

80. Loc. cit.

81. Op. cit., page 20.

82. Daniel Yankelovich and John Immerwahr, Putting the Work Ethic to Work: A Public Agenda on Restoring America's Competitive Vitality, 1983, page 4.

83. Op. cit., pages 2 and 3.

84. Op. cit., page 20.

85. Op. cit., page 27.

POLICY: Assure that basic education and vocational training are available for the educationally disadvantaged, unemployed, and those seeking occupational mobility.

Implementation Recommendation #1: Fund adult education and vocational educational courses so that the educationally disadvantaged, unemployed, and those seeking occupational mobility are provided with basic skills (including literacy training) required of entry level high school graduates.

Adult education should be integrated with industry specific training, if possible. If not, basic skills should be the first step of a program which provides industry specific training.

The vocational education component should provide upward mobility for the participants.

Implementation Recommendation #2: Expand adult education courses which have the following features that have been found to be effective: open entry - open exit, competency based programs, including computer assisted instruction, flexible programming, performance based instruction and evaluation and job training at business/industry sites.

Implementation Recommendation #3: Expand the literacy outreach program and encourage linkage with the adult education system.

POLICY: Provide access for new entrants and the unemployed to industry specific training and provide retraining to workers who may be displaced by changes in technology or in the economy.

Implementation Recommendation #1: Expand the capacity of the Community Colleges, the Employment Training Panel and other public and private training institutions to implement industry specific programs with the private sector.

Additional funding for capital outlay for expensive equipment may be jointly funded by industry, the community colleges and the Employment Panel.

Implementation Recommendation #2: Industry specific training should be subject to performance requirements whether it is funded by the State on an Average Daily Attendance (ADA) basis or by the Employment Panel.

A system for supplementing ADA should be expanded so that adequate funding is provided for expensive equipment which may be necessary for some high demand, industry specific training.

Participants without prerequisite basic skills should be given an opportunity to achieve those skills through an open entry - open exit adult education program either before enrollment in the industry-specific training or concurrent with industry specific training. Financial incentives should be increased if necessary to assure enrollment of an educational disadvantaged population in performance based training programs. Special training programs may need to be developed for slower learners.

POLICY: Assure that students have educated and trained teachers.

Implementation Recommendation #1: Support the recommendations of the California Commission on Teaching Profession to improve the credentialing standards for teachers.

Implementation Recommendation #2: Support inservice training programs for teachers which are consistent with the Pittsburg Research-Based Instructional Supervisory Model.

POLICY: Integrate computers, videos and other technologies into the school instructional program in grades K-6. Students should be advanced based upon performance.

Implementation Recommendation #1: Provide funding for model schools on a competitive basis to school districts, particularly in the central city with large minority populations, to develop school instructional programs where such technology is integrated.

The goal is to develop and test such integrated school instructional programs beginning with kindergarten. The instructional programs should be restructured to:

- allow more efficient management of classes;
- permit students to learn at their own rate;
- identify and immediately correct learning problems that a student may be having;
- allow teachers to spend more time with individuals and small groups; and,
- allow teachers to broker the most appropriate media for the presentation of information for each class.

The integration of the computer in the school instructional program should be structured so that there is early identification and correction of learning problems. The program should assure that students proceed after the successful learning of each set of tasks. They should not be passed without mastering the "basics."

Funding should be provided for hardware, software, maintenance of the equipment, facility space, expertise from consultants, training of faculty and release time for faculty to develop and test the integrated school instructional program. Joint funding with the private sector should be encouraged.

Implementation Recommendation #2: Provide incentives to schools of education, psychology and computer departments to research learning theory, develop a new computer language which would simplify the development of courseware authoring techniques and software, and develop the most effective methods to integrate media, computers and other technologies into the school instructional program.

POLICY: Increase student achievement in math and science in K-12.

Implementation Recommendation #1: Provide sufficient incentives for qualified math and science faculty to remain in teaching positions.

Implementation Recommendation #2: Provide in-service training in science and math to those who are currently teaching. Increase credentialing requirements so that those who teach science and math are competent in the subject area.

Implementation Recommendation #3: Provide adequate funding for textbooks, equipment and supplies.

Implementation Recommendation #4: Develop State science and technology schools for high ability students, modeled after the Bronx School of Science in New York.

POLICY: Assure that schools are administered by capable superintendents, principals and administrators.

Implementation Recommendation: a) Implement a valid performance based evaluation of candidates for an administrative credential conducted by an independent agency or the State Commission on Teacher Credentialing, b) require continuing evaluation of credentialing requirements, c) increase in-service leadership training, as well as training in personnel and budget management for administrators, and d) encourage mentor relationships between successful administrators in the private and public sectors.

POLICY: Increase the number of Californians who are able to speak foreign languages and understand cultures, particularly those of the Pacific Rim countries.

Implementation Recommendation #1: Offer foreign language courses and laboratories for Japanese, Chinese and Spanish in high school.

Implementation Recommendation #2: Provide scholarships and work study to college students who learn a foreign language such as Japanese, Chinese, or Spanish. Provide additional support to the study abroad program.

Implementation Recommendation #3: Develop centers for translating foreign (Japanese) business and scientific documents on some of the University's campuses to provide students with pertinent work and to provide the public and private sector with information on technological developments. As an adjunct to these centers, establish a fee-based program for translations of scientific, technical, regulatory and legal papers for the business and professional community.

Implementation Recommendation #4: Expand the Global Affairs program developed by Stanford University and authorized by AB 2543 (Farr, Statutes of 1985).

POLICY: Increase the percentage of domestic students in engineering and computer science graduate programs.

Implementation Recommendation #1: Increase funding for graduate fellowships for domestic graduate students. These fellowships may be funded jointly with the private sector.

Implementation Recommendation #2: Require the California Postsecondary Education Commission to conduct a survey to ascertain the number of nonresident alien graduate students who remain to work in the U.S. and California.

POLICY: Transform the workplace by encouraging the adoption of employment policies which will enhance productivity, such as incentive pay, a change in management techniques to account for the discretion created by technology, and adoption of "employment security" policies by the private sector.

Implementation Recommendation #1: Provide incentives for the Schools of Business Management and Schools of Engineering to cooperate in the development of a curriculum that focuses on the management of both "human capital" and the manufacturing process to produce high quality, competitively priced products.

Implementation Recommendation #2: Provide employers which have employment security policies first priority in receiving scarce employment and training services.

CHAPTER 6

Summary of Policy Recommendations

INDUSTRIAL COMPETITIVENESS

POLICY: The State should establish a research agenda.

Implementation Recommendation #1: Establish a Center for Manufacturing Competitiveness within the University of California at a site with both a school of business management and a school of engineering to oversee a coordinated program of manufacturing research and development grants, and to develop and disseminate, through the Technology Extension Service, advance process technology and management practices. It should function as a university/industry consortium, directed by a system-wide executive committee consisting of various campus program representatives, industry representatives, and state economic development officials.

Implementation Recommendation #2: Establish Manufacturing Engineering Centers of Excellence with the University of California and the California State University systems to better train engineers and managers in the manufacturing process.

Implementation Recommendation #3: Establish a "Micro" program for Biotechnology.

Implementation Recommendation #4: Create a California Research Council composed of scientific advisors from California who are elected to the National Academy of Sciences, the National Engineering Academy and the National Academy of Medicine. The Council should establish a research agenda for the state by identifying those areas which are vital and most fruitful for research in maintaining the state's competitiveness and promoting health and safety. The Council shall establish an advisory committee from the private sector and state government.

The Council should establish procedures for reviewing, awarding, and monitoring research grants in the identified areas.

The Council would administer a research fund to be established with state General Funds. Every attempt should be made to secure matching funds from the federal government, the private sector, and universities.

POLICY: Encourage the development of flexible manufacturing systems.

Implementation Recommendation: Pursue establishing a model facility in California with the U.S Department of Commerce.

Evaluate the feasibility of expanding the model by the private sector. Review the need for any governmental incentives or deregulation, if private sector development of such facilities prove infeasible.

POLICY: Enhance the transfer of technology between the State's research institutions and national laboratories and the private sector.

Implementation Recommendation #1: The University of California should develop a computerized bibliography of research papers and on-going projects in all scientific and technical areas. This information should be provided to the private sector so that basic research can be fully explored for further applied research.

Implementation Recommendation #2: The University should establish a Technology Extension Service. The Service would a) broker requests for information from the private sector with University researchers and national research laboratories,

b) establish a mechanism for the technical evaluation of business proposals, c) disseminate critical research findings to California-based industries, and d) coordinate with agencies providing services to small businesses so that entrepreneurs who need assistance in establishing a business can receive such training and assistance.

Implementation Recommendation #3: Review the University of California's patent and licensing policies.

POLICY #4: The State should review the investment priorities of its pensions funds in order to enhance investment in the expansion of business in California, particularly those businesses which need to adopt advance manufacturing processes or upgrade their plant and equipment to remain competitive.

Implementation Recommendation: Establish a Council on Investment Priorities to review and encourage investments of our public pension funds in expanding manufacturing in California.

AGRICULTURE

California government must take a more active role in supporting agriculture with new or modified programs which help farmers meet changing needs and new economic developments. The State's public universities should be an integral part of the effort, providing research, analysis, information and other educational programs, including helping to coordinate meetings and conferences. Increased access to management training and information which will enhance farmers' capabilities as entrepreneurs as well as their success as growers should be encouraged.

As the federal government diminishes its funding of resource protection programs and signals its intent to reduce price

support programs for major commodities, it becomes imperative for California to take a lead role in ensuring the health of the State's agriculture industry. The significance of the export market further demands the State's attention, particularly in the formulation of federal policy and trade agreements.

POLICY: A primary goal of the State's agricultural policy shall be to enhance the domestic and international marketing of California's fresh and processed agricultural products. In promoting exports of farm commodities, attention must continue to be given to the 80% of California's production which is sold domestically.

Implementation Recommendation #1: Give priority to applied research by the University and state related agencies on the development of new consumer products, new uses for commodities, and processing technologies which will increase sales and enhance the marketability of California commodities.

Implementation Recommendation #2: Give higher priority in the allocation of state financial resources to projects which have a market orientation, conserve the resource base of agriculture, or protect the public health and safety. Require an educational component which ensures the distribution of research findings.

Implementation Recommendation #3: Conduct research and disseminate information on the agricultural marketing systems to expand options for small and medium sized growers. The University's Cooperative Extension should increase the marketing expertise of its staff by developing forecasting techniques and skills. Data collection and analysis of markets should be encouraged through the use of existing state and federal news services.

Implementation Recommendation #4: Develop greater public/private partnership for research in areas identified by economic analysis as vital in maintaining the industry competitiveness.

Implementation Recommendation #5: Review the State's water policy which historically promotes new water supplies and thus implicitly encourages the development of additional agricultural acreage and production. The review should include an analysis of whether new acreage and increased production would be beneficial for growers and the State.

Implementation Recommendation #6: Ensure the adequacy of inspection of imported fruits and vegetables for chemical residue, plant health and pest control to guarantee conformity to standards required of commodities grown within California.

POLICY: Promote research and educational programs which decrease costs, advance resource conservation, protect public health and safety, and minimize usage of agricultural chemicals in rural and urban California.

Implementation Recommendation #1: Develop a systematic method for data collection, including coordination and analysis of agricultural natural resource-related studies and research conducted by local, state and federal agencies. Report annually to the Legislature the compilation of the resultant information on soils, soils management, irrigation practices, chemicals and other inputs which affect drainage, groundwater problems and sustainability of farming.

Implementation Recommendation #2: Support acceleration of studies on growing methods, including integrated pest management and biological control, to decrease use of energy and chemicals, enhance understanding of the ecology of the State's agriculture, and sustain the viability of California farm operations.

Implementation Recommendation #3: The Cooperative Extension shall develop and make available coordinated analyses of research pertaining to soils, cropping patterns, water content, and other pertinent data relevant to decisions on irrigation systems and other agricultural practices which can minimize environmental costs and maximize agricultural entrepreneurship.

POLICY: Encourage improved communication and linkage between sectors and interests involved in California for greater policy input.

Implementation Recommendation #1: Facilitate the development of a coalition of agricultural producers including specialty crop growers which meets regularly to advise the Legislature on marketing and other agriculture issues.

Implementation Recommendation #2: Sponsor under the State aegis biannual conferences to facilitate and encourage communication and other linkages between policy-makers, production farmers, processors and packers, technology interests, consumers, environmental groups, and others with specific or general interests in agriculture.

TRADE

MAJOR POLICY

Exportation of California's goods, commodities and services shall be a primary goal of the state's trade policy. The State shall promote trade with a mix of programs and actions that develop export potential, expand funding opportunities, influence federal policies affecting California trade, and facilitate international commercial exchange. Particular attention will be focused on nations of the Pacific Rim, especially the rapidly developing Asian economies.

POLICY: Pursue a focused trade policy for California with an emphasis on promotion of export of California products and the international competitiveness of California industries.

Implementation Recommendation #1: Establish within the Business, Transportation and Housing Agency a strong administrative structure which will ensure the coordination of state programs related to the competitiveness of our industries, monitor domestic and overseas developments on trade issues in cooperation with the World Trade Commission, the Department of Food and Agriculture and other state agencies with trade responsibilities. The Agency should also establish an active California presence in Washington to work with the Administration and Congress in furtherance of the interests of California's industrial competitiveness and expansion of our export opportunities.

Implementation Recommendation #2: Expand California's current export finance program with additional funds, adding provisions for conditional removal of the loan guarantee cap, and develop new programs with matching fund requirements for larger contracts and exporters. Program targets should continue to be small, medium-sized and newly-exporting firms.

POLICY: Develop a powerful state infrastructure to assist firms which are able to export to find opportunities to do so. Promote the concept of "domestic substitution" by which in-state demands for services and supplies are met by in-state suppliers.

Implementation Recommendation #1: Establish a Division of World Trade within the Department of Commerce. This Division would work with local Chambers of Commerce, Economic Development Associations and other organizations to identify small and medium-sized firms with export potential. The Division would also operate a program to monitor foreign investment in California and organize a data bank and information program,

coordinating with the World Trade Commission, to provide leads on trade opportunities to the private sector.

Implementation Recommendation #2: The Division would promote the pursuit of "domestic substitution" as a competitive strategy, by developing data and analyses which identify needed products of out-of-state origin and potential in-state suppliers. The Division will thus serve as a clearinghouse of such needs, thereby providing new markets for California's new or maturing industries.

Implementation Recommendation #3: Support investment by pension funds, government bonds or venture capital in new California enterprises which replace state imports with local products.

POLICY: Enhance the development of California's export potential with overseas technical and logistical assistance.

Implementation Recommendations #1: Establish California Overseas Trade Offices under the aegis of the Governor's Office. An abiding and long-term commitment, evinced with substantial funding for sufficient and experienced staff familiar with foreign languages, business community, culture, and governments of both California and its market(s), is necessary. The overseas office will counsel California firms in their dealings abroad and assist in making contacts, accessing supplier and distributor networks, translating documents, arranging facilities, developing the necessary foreign infrastructure, enhancing cultural understanding, and monitoring market and governmental developments to provide commercial intelligence to businesses and the domestic trade office.

Implementation Recommendation #2: Given California's volume of trade with and economic development of the Asian Pacific region, the first of the overseas offices should be located in Tokyo,

Japan. With credible domestic data and overseas market intelligence, additional offices should be opened in a second Pacific Rim location (outside Japan), Europe, Canada and Latin America.

POLICY: Increase the emphasis on global affairs in our educational system to prepare California citizens for living and working in a global economy.

Implementation Recommendation #1: Expand support and funding of AB 2543 (Farr, Statutes of 1985) to provide articulated global studies curriculum as developed by Stanford University throughout the K-12 public school system.

Implementation Recommendation #2: Further integrate language, culture, and international affairs courses into business and management curricula in the State's higher education institutions.

Implementation Recommendation #3: Establish international business fellowships for overseas placement, funded and coordinated in partnership between the public and private sectors and expand current study abroad programs.

Implementation Recommendation #4: Develop centers for translation of foreign business and scientific documents on some of the University's campuses to provide students with pertinent work and to provide the public and private sector with information on technological developments. As an adjunct to these centers, establish a fee-based program for translations of scientific, technical, regulatory, and legal papers for the business and professional community.

HUMAN RESOURCES

POLICY: Assure that basic education and vocational training are available for the educationally disadvantaged, unemployed, and those seeking occupational mobility.

Implementation Recommendation #1: Fund adult education and vocational educational courses so that the educationally disadvantaged, unemployed, and those seeking occupational mobility are provided with basic skills (including literacy training) required of entry level high school graduates.

Adult education should be integrated with industry specific training, if possible. If not, basic skills should be the first step of a program which provides industry specific training.

The vocational education component should provide upward mobility for the participants.

Implementation Recommendation #2: Expand adult education courses which have the following features that have been found to be effective: open entry - open exit, competency based programs, including computer assisted instruction, flexible programming, performance based instruction and evaluation and job training at business/industry sites.

Implementation Recommendation #3: Expand the literacy outreach program and encourage linkage with the adult education system.

POLICY: Provide access for new entrants and the unemployed to industry specific training and provide retraining to workers who may be displaced by changes in technology or in the economy.

Implementation Recommendation #1: Expand the capacity of the Community Colleges, the Employment Training Panel and other public and private training institutions to implement industry specific programs with the private sector.

Additional funding for capital outlay for expensive equipment may be jointly funded by industry, the community colleges and the Employment Panel.

Implementation Recommendation #2: Industry specific training should be subject to performance requirements whether it is funded by the State on an Average Daily Attendance (ADA) basis or by the Employment Panel.

A system for supplementing ADA should be expanded so that adequate funding is provided for expensive equipment which may be necessary for some high demand, industry specific training.

Participants without prerequisite basic skills should be given an opportunity to achieve those skills through an open entry - open exit adult education program either before enrollment in the industry-specific training or concurrent with industry specific training. Financial incentives should be increased if necessary to assure enrollment of an educational disadvantaged population in performance based training programs. Special training programs may need to be developed for slower learners.

POLICY: Assure that students have educated and trained teachers.

Implementation Recommendation #1: Support the recommendations of the California Commission on Teaching Profession to improve the credentialing standards for teachers.

Implementation Recommendation #2: Support inservice training programs for teachers which are consistent with the Pittsburg Research-Based Instructional Supervisory Model.

POLICY: Integrate computers, videos and other technologies into the school instructional program in grades K-6. Students should be advanced based upon performance.

Implementation Recommendation #1: Provide funding for model schools on a competitive basis to school districts, particularly in the central city with large minority populations, to develop school instructional programs where such technology is integrated.

The goal is to develop and test such integrated school instructional programs beginning with kindergarten. The instructional programs should be restructured to:

- allow more efficient management of classes;
- permit students to learn at their own rate;
- identify and immediately correct learning problems that a student may be having;
- allow teachers to spend more time with individuals and small groups; and,
- allow teachers to broker the most appropriate media for the presentation of information for each class.

The integration of the computer in the school instructional program should be structured so that there is early identification and correction of learning problems. The program should assure that students proceed after the successful learning of each set of tasks. They should not be passed without mastering the "basics."

Funding should be provided for hardware, software, maintenance of the equipment, facility space, expertise from consultants, training of faculty and release time for faculty to develop and test the integrated school instructional program. Joint funding with the private sector should be encouraged.

Implementation Recommendation #2: Provide incentives to schools of education, psychology and computer departments to research learning theory, develop a new computer language which would simplify the development of courseware authoring techniques and software, and develop the most effective methods to integrate media, computers and other technologies into the school instructional program.

POLICY: Increase student achievement in math and science in K-12.

Implementation Recommendation #1: Provide sufficient incentives for qualified math and science faculty to remain in teaching positions.

Implementation Recommendation #2: Provide in-service training in science and math to those who are currently teaching. Increase credentialing requirements so that those who teach science and math are competent in the subject area.

Implementation Recommendation #3: Provide adequate funding for textbooks, equipment and supplies.

Implementation Recommendation #4: Develop State science and technology schools for high ability students, modeled after the Bronx School of Science in New York.

POLICY: Assure that schools are administered by capable superintendents, principals and administrators.

Implementation Recommendation: a) Implement a valid performance based evaluation of candidates for an administrative credential conducted by an independent agency or the State Commission on Teacher Credentialing, b) require continuing evaluation of

credentialing requirements, c) increase in-service leadership training, as well as training in personnel and budget management for administrators, and d) encourage mentor relationships between successful administrators in the private and public sectors.

POLICY: Increase the number of Californians who are able to speak foreign languages and understand cultures, particularly those of the Pacific Rim countries.

Implementation Recommendation #1: Offer foreign language courses and laboratories for Japanese, Chinese and Spanish in high school.

Implementation Recommendation #2: Provide scholarships and work study to college students who learn a foreign language such as Japanese, Chinese, or Spanish. Provide additional support to the study abroad program.

Implementation Recommendation #3: Develop centers for translating foreign (Japanese) business and scientific documents on some of the University's campuses to provide students with pertinent work and to provide the public and private sector with information on technological developments. As an adjunct to these centers, establish a fee-based program for translations of scientific, technical, regulatory and legal papers for the business and professional community.

Implementation Recommendation #4: Expand the Global Affairs program developed by Stanford University and authorized by AB 2543 (Farr, Statutes of 1985).

POLICY: Increase the percentage of domestic students in engineering and computer science graduate programs.

Implementation Recommendation #1: Increase funding for graduate fellowships for domestic graduate students. These fellowships may be funded jointly with the private sector.

Implementation Recommendation #2: Require the California Postsecondary Education Commission to conduct a survey to ascertain the number of nonresident alien graduate students who remain to work in the U.S. and California.

POLICY: Transform the workplace by encouraging the adoption of employment policies which will enhance productivity, such as incentive pay, a change in management techniques to account for the discretion created by technology, and adoption of "employment security" policies by the private sector.

Implementation Recommendation #1: Provide incentives for the Schools of Business Management and Schools of Engineering to cooperate in the development of a curriculum that focuses on the management of both "human capital" and the manufacturing process to produce high quality, competitively priced products.

Implementation Recommendation #2: Provide employers which have employment security policies first priority in receiving scarce employment and training services.

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